



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
ATLANTA FEDERAL CENTER
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ATLANTA, GEORGIA 30303-8960

APR 12 2005

LaJuana S. Wilcher, Secretary
Kentucky Environmental and Public Protection Cabinet
Capital Plaza Tower
Frankfort, KY 40601

Dear Ms. Wilcher:

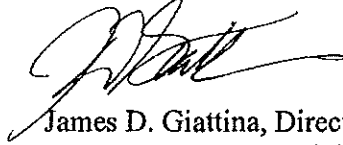
The Environmental Protection Agency (EPA) has completed its review of the new and revised provisions of regulation 401 KAR 5:030, entitled "Antidegradation policy implementation methodology," and the related provisions in 401 KAR 5:002, "Definitions for 401 KAR Chapter 5," as documented in the enclosed, "United States Environmental Protection Agency Determination Under Section 303(c) of the Clean Water Act – Review of Regulation 401 KAR 5:030 Kentucky Antidegradation Policy Implementation Methodology." The Commonwealth adopted these new and revised standards on September 8, 2004, and submitted them to the EPA for review in a letter dated September 23, 2004, from LaJuana S. Wilcher, Secretary of the Kentucky Environmental and Public Protection Cabinet (the Cabinet), to James I. Palmer, Regional Administrator of EPA's Region 4 Office. The letter transmitting the new and revised standards for EPA review included a certification, dated September 15, 2004, by the General Counsel of the Cabinet's Office of Legal Service that the revisions were duly adopted pursuant to Kentucky law. The Commonwealth provided additional information and clarification regarding these new and revised standards in letters dated August 10, 2004, and February 25, 2005, from LaJuana S. Wilcher, Secretary, Kentucky Environmental and Public Protection Cabinet to Jim Giattina, Director, EPA Region 4 Water Management Division, and in a letter dated April 11, 2005, from LaJuana S. Wilcher, Secretary, Kentucky Environmental and Public Protection Cabinet to Benjamin Grumbles, EPA Assistant Administrator for Water and Jimmy Palmer, EPA Regional Administrator.

Based on EPA's review of the regulation and the supporting information provided by the Commonwealth, it is EPA's conclusion that the requirements of the Clean Water Act and provisions of 40 CFR Part 131 have been met. Therefore, EPA is approving the new and revised standards in regulation 401 KAR 5:030 and two related revisions to 401 KAR 5:002 that relate to implementation of antidegradation in the Commonwealth as a change to Kentucky water quality standards under section 303(c) of the Clean Water Act and 40 CFR Part 131.

I want to congratulate the Kentucky Division of Water and others in the Commonwealth on the development of these water quality standards. These standards will provide an important contribution to the protection of Kentucky high quality waters. I also would like to extend my

appreciation to you and your staff for the efforts and commitment to work with my staff concerning this matter. If you have any questions concerning EPA's action to approve these standards, please contact me at 404/562-9345.

Sincerely,

A handwritten signature in black ink, appearing to read 'J. Giattina', with a stylized flourish at the end.

James D. Giattina, Director
Water Management Division

Enclosure

**United States Environmental Protection Agency Determination
Under Section 303(c) of the Clean Water Act
Review of Regulation 401 KAR 5:030
Kentucky Antidegradation Policy Implementation Methodology**

On September 23, 2004, Kentucky submitted for U.S. Environmental Protection Agency (EPA) review new and revised water quality standards in regulation 401 Kentucky Administrative Register (KAR) 5:030 [Antidegradation policy implementation methodology]. These revisions to Kentucky's water quality standards were adopted on September 8, 2004 as a result of the Commonwealth's 2003 – 2004 triennial review. The new and revised standards were submitted to EPA in a letter dated September 23, 2004, from LaJuana S. Wilcher, Secretary of the Kentucky Environmental and Public Protection Cabinet (the Cabinet), to James I. Palmer, Regional Administrator of EPA's Region 4 Office. The letter transmitting the new and revised standards for EPA review included a certification, dated September 15, 2004, by the General Counsel of the Cabinet's Office of Legal Service that the revisions were duly adopted pursuant to Kentucky law.

Kentucky also adopted new and revised standards during the 2003 – 2004 triennial review in the following regulations: 401 KAR 5:002 [Definitions for 401 KAR Chapter 5], 401 KAR 5:026 [Designation of uses of surface waters], 401 KAR 5:029 [General Provisions], and 401 KAR 5:031 [Surface water standards]. With the exception of the newly adopted definition for "high quality water" and Kentucky's action to delete the definition of "use protected water" in 401 KAR 5:002 (both of which specifically relate to provisions in 401 KAR 5:030), EPA approved the new and revised water quality standards in these four chapters of the Commonwealth's administrative regulations on December 17, 2004. Therefore, the only provisions adopted during Kentucky's 2003 – 2004 triennial review that EPA has not acted on under Clean Water Act (CWA) section 303(c) authorities are the definitions of "high quality water" and "use protected water," and the new and revised portions of 401 KAR 5:030.

BACKGROUND

What approach is EPA taking in presenting the results of its review of the Rule?

Part 1 of this document summarizes the history of Kentucky's efforts to adopt antidegradation implementation procedures. Part 2 summarizes the categories of waters covered by the procedures adopted by Kentucky in 2004. Part 3 discusses EPA's review of Kentucky's categories of waters for the purpose of an antidegradation review. Part 4 discusses EPA's review of the new and revised implementation provisions that utilize existing Cabinet programs, default effluent limitations and tests for significance. Part 5 discusses EPA's review of other new and revised provisions in Kentucky's antidegradation implementation methodology in 401 KAR 5:030 and 401 KAR 5:002. Part 6 includes a summary of conclusions.

PART 1 – HISTORY

What is the history of the Commonwealth's efforts to adopt antidegradation implementation procedures?

Regulation 401 KAR 5:030 was initially adopted by Kentucky as the Commonwealth's "Nondegradation policy implementation methodology," on July 12, 1995. This regulation included a category of "exceptional waters," which was intended by the Commonwealth to include surface waters of the Commonwealth that met the 40 CFR 131.12(a) (2) criteria for high quality waters: waters with quality that exceeds the "levels necessary to support propagation of fish, shellfish, and wildlife, and recreation in and on the water."

In a letter of August 7, 1997, from John H. Hankinson, Jr., EPA Region 4 Regional Administrator, to General James E. Bickford, Secretary, Kentucky Natural Resources and Environmental Protection Cabinet, EPA Region 4 disapproved the Commonwealth's eligibility criteria in 401 KAR 5:030 subsection 1. (3) for designating waters to be given high quality water protection, i.e., "exceptional waters," and specified the changes needed for EPA to approve a revised water quality standard. EPA's 1997 disapproval action was taken "because these criteria are not sufficiently inclusive and, therefore, do not meet the requirements of 40 CFR Section 131.12." In order to address the disapproval, EPA asked the Commonwealth to "include additional selection criteria under subsection 1. (3). The additional selection criteria must address the inclusion of Tier II waters where water quality conditions exceed the levels necessary to support propagation of fish, shellfish, and wildlife and recreation in and on the water. The additional selection criteria could use either the designational approach or the pollutant-by-pollutant approach."

In an October 9, 1997, letter from General James E. Bickford, Secretary, Commonwealth of Kentucky Natural Resources and Environmental Protection Cabinet to John H. Hankinson, Jr., EPA Region 4 Regional Administrator, responding to EPA's disapproval, Kentucky stated its intention to expand the universe of high quality waters receiving added protection from the effects of point source discharges regulated under the Kentucky Pollutant Discharge Elimination System (KPDES) program. Kentucky also indicated that the revisions would be part of its upcoming triennial review of water quality standards.

Kentucky began a water quality standards triennial review in October 1998 with a public notice and mailing to interested parties of its intent to update uses, revise numeric criteria, strengthen mixing zone language, and respond to EPA's 1997 antidegradation disapproval. After adoption of revisions to Kentucky water quality standards on December 8, 1999, Kentucky submitted the results of its triennial review to EPA on December 15, 1999. However, the revisions did not sufficiently broaden the criteria to increase the number of eligible waters for the exceptional waters category, so as to be consistent with EPA's regulation at 40 CFR 131.12(a)(2). Therefore, on

August 30, 2000, EPA Region 4 notified the Commonwealth that the high quality waters provisions of Kentucky's water quality standards remained disapproved.

In a letter of May 24, 2001, from Mr. Jack A. Wilson, Director, KDOW, to Ms. Beverly Banister, Director, EPA Region 4 Water Management Division, Kentucky clarified that the exceptional waters category is intended to provide a higher level of protection than the level for other high quality waters. Several states and authorized tribes have created an additional category of water between high quality waters and Outstanding National Resource Waters (ONRWs) in their antidegradation policy. Kentucky's exceptional waters category generally includes more stringent eligibility criteria and/or controls than those required for high quality waters, but allows more flexibility to make adjustments in criteria and in permitting decisions than would normally be allowed if the water body were designated as an ONRW. EPA believes such a category is consistent with the intent and spirit of the antidegradation policy when supplementing the high quality water and the ONRW categories. However, this clarification did not address EPA's disapproval, since the Commonwealth's standards did not include a high quality waters category, and the exceptional waters category did not include the necessary selection criteria for sufficient coverage of all high quality waters.

On November 14, 2002, EPA proposed a federal rule for Kentucky in order to replace the provisions of Kentucky's antidegradation regulation that were disapproved by EPA on August 7, 1997. EPA, in the notice to the proposed rule, estimated the length of stream miles, the number of water bodies, and the percentage of total stream miles in each of the antidegradation categories of waters in effect for Kentucky water quality standards at that time:

<u>Categories (2002)</u>	<u>Stream Miles</u>	<u>Water Bodies</u>	<u>% of Total Stream Miles</u>
Outstanding national resource waters	29.6	3	0.06
Exceptional waters	665.0	75	1.35
Use protected, but impaired	3,945.0	700	8.0
Use protected, and not determined to be impaired	44,460.0	(All others)	90.6

[67 FR 68975]

The 2002 categorization indicated that approximately 1.4 percent of Kentucky waters were receiving a level of protection consistent with the federal requirements for high quality waters at 40 CFR 131.12(a)(2), leaving over 90 percent of the mileage of the Commonwealth's streams as not receiving high quality water protection.

On September 8, 2004, Kentucky completed its 2003- 2004 triennial review, and, on September 23, 2004, submitted for U.S. Environmental Protection Agency (EPA) review the new and revised water quality standards in regulation 401 KAR 5:030 [Antidegradation policy implementation methodology].

PART 2 – CATEGORIES OF WATERS COVERED BY THE PROCEDURES ADOPTED BY KENTUCKY IN 2004

What is included in the Commonwealth's Revised Antidegradation Implementation Methods in 401 KAR 5:030?

The introduction to Regulation 401 KAR 5:030 describes the provisions of 401 KAR 5:030 as "a methodology to implement the antidegradation policy contained in 401 KAR 5:029. It establishes procedures to control water pollution in waters affected by that policy." Kentucky's antidegradation policy in 401 KAR 5:029 states:

Section 1. Antidegradation Policy. (1) The purpose of 401 KAR 5:026 to 401 KAR 5:031 is to safeguard the surface waters of the commonwealth for their designated uses, to prevent the creation of any new pollution of these waters, and to abate any existing pollution.

(2) Where the quality of surface waters exceeds that necessary to support propagation of fish, shellfish, wildlife and recreation in and on the water, that quality shall be maintained and protected unless the cabinet finds, after full satisfaction of the intergovernmental coordination and public participation provisions of the cabinet's continuing planning process, that allowing lower water quality is necessary to accommodate important economic or social development in the area in which the waters are located. For point source discharges, water quality shall be maintained and protected in these waters according to the procedures specified in 401 KAR 5:030, Section 1.(2)(b) or (3)(b). In allowing degradation or lower water quality, the cabinet shall assure water quality adequate to protect existing uses fully. Further, the cabinet shall assure that there shall be achieved the highest statutory and regulatory requirements for waste treatment by all new and existing point sources and that nonpoint sources of pollutants be controlled by application of all cost effective and reasonable best management practices.

(3) Water quality shall be maintained and protected in a water categorized as an outstanding national resource water according to the procedures specified in 401 KAR 5:030, Section 1.(1)(b).

(4) Water quality shall be maintained and protected in those waters designated as outstanding state resource waters according to the procedures specified in 401 KAR 5:031, Section 8.

(5) If potential water quality impairment associated with a thermal discharge is involved, a successful demonstration conducted under Section 316 of the Clean Water Act, 33 U.S.C. 1326, shall be in compliance with this section.

Regulation 401 KAR 5:030, as revised, now contains three sections: Section 1. [Categorization and Implementation], Section 2. [Procedure for Recategorizing Water], and Section 3. [Incorporation by Reference]. The majority of new and revised standards in this regulation are contained in Section 1 [Categorization and Implementation], which now consists of four subsections: (1) ONRW, (2) Exceptional water, (3) High quality water, and (4) Impaired water. Each subsection contains two paragraphs: (a) Categorization criteria, and (b) Implementation procedure.

What waters does Kentucky's antidegradation implementation rule now cover?

The category of exceptional waters was not modified by the Commonwealth during the 2003 – 2004 triennial review. 401 KAR 5:030 Section 1.(2)(a) defines the category of exceptional waters to include the following:

1. Surface water is designated as a Kentucky Wild River and is not categorized as an outstanding national resource water;
2. Surface water is designated as an outstanding state resource water as set forth in 401 KAR 5:031, Section 8.(1)(a)1, 2, and 3 and Section 8.(1)(b);
3. Surface water contains either of the following:
 - a. A fish community that is rated "excellent" by the use of the Index of Biotic Integrity included in "Development and Application of the Kentucky Index of Biotic Integrity (KIBI)", 2003, incorporated by reference in Section 3 of this administrative regulation; or
 - b. A macroinvertebrate community that is rated "excellent" by the Macroinvertebrate Bioassessment Index included in "The Kentucky Macroinvertebrate Bioassessment Index," 2003, incorporated by reference in Section 3 of this administrative regulation; or
4. Surface water in the cabinet's reference reach network.

The criteria for OSRWs, that are included as exceptional waters in the second category above, include: [401 KAR 5:031 Section 8(1)(a)1, 2, and 3 and 8(1)(b)]:

(a) Automatic inclusion. The following surface waters shall automatically be included in this category:

1. Waters designated under the Kentucky Wild Rivers Act, KRS 146.200-146.360;
2. Waters designated under the Federal Wild and Scenic Rivers Act, 16 U.S.C. 1271 et seq.;

3. Waters identified under the Kentucky Nature Preserves Act, KRS 146.410-146.530, which are contained within a formally dedicated nature preserve or are published in the registry of natural areas in accordance with 400 KAR 2:080 and concurred upon by the cabinet; . . .

(b) Permissible consideration. Other surface waters may be included in this category as determined by the cabinet if:

1. The surface waters flow through or are bounded by state or federal forest land, or are of exceptional aesthetic or ecological value or are within the boundaries of national, state, or local government parks, or are a part of a unique geological or historical area recognized by state or federal designation; or

2. The surface water is a component part of an undisturbed or relatively undisturbed watershed that can provide basic scientific data and possess outstanding water quality characteristics; or fulfill two (2) of the following criteria:

a. Support a diverse or unique native aquatic flora or fauna;

b. Possess physical or chemical characteristics that provide an unusual and uncommon aquatic habitat; or

c. Provide a unique aquatic environment within a physiographic region.

401 KAR 5:030 Section 1.(3)(a) was adopted in 2004 by the Commonwealth to expand the categorization criteria for high quality waters, as follows:

1. A surface water shall be categorized as high quality water if the surface water is not listed as an outstanding national resource water or an exceptional water in Table 1 or 2 of this section and if the surface water does not meet the criteria for impaired water as provided for in subsection 4(a) of this section.

2. A surface water shall be categorized as a high quality water if the surface water is listed as an outstanding state resource water in 401 KAR 5:026 and is not listed as an outstanding national resource water or an exceptional water in Table 1 or 2 of this section.

The categorization criteria for impaired waters listed in 401 KAR 5:030 Section 1.(4)(a) is as follows:

A surface water categorized as impaired for applicable designated uses shall be a water identified pursuant to 33 U.S.C. 1315. Surface water categorized as impaired shall be assessed by the cabinet as not fully supporting any applicable designated uses. A surface water shall not be categorized as impaired water if the surface water is listed as an outstanding state resource water in 401 KAR 5:026.

PART - 3 DISCUSSION OF EPA'S REVIEW OF THE CATEGORIES OF WATERS COVERED BY THE ANTIDEGRADATION IMPLEMENTATION PROCEDURES

What is EPA's conclusion on whether Kentucky's revised categories of waters adequately address all "high quality" waters required by 131.12?

The Commonwealth's use of another CWA provision, i.e., section 305(b), for determinations of "impairment" is an acceptable approach for the exclusion of waters that will not be given high quality water protection under 40 CFR § 131.12(a)(2). This provision states that waters with quality that "exceed levels necessary to support propagation of fish, shellfish, and wildlife, and recreation in and on the water," (emphasis added) should receive consideration for high quality water protection under the federal antidegradation policy. The Commonwealth's choice of selection criteria to address this requirement, i.e., to exclude waters which have been "assessed as not fully supporting any applicable designated uses," and to include those excluded waters in the "impaired water" category, is consistent with the federal requirement that high quality waters have water quality that supports both aquatic life-based uses and recreation-based uses.

With the adoption of the new category of high quality waters during the 2003 - 2004 triennial review, the Commonwealth's antidegradation rule now covers all waters as required by 40 CFR § 131.12. This addition addresses the deficiency identified in 1997 in the coverage of waters to be provided high quality water protection. EPA approves the Commonwealth's new category of high quality waters.

What is the background for EPA's conclusion that the Commonwealth's antidegradation review now covers all appropriate waters?

The Commonwealth adopted an "exceptional water" category in 1999, and no substantive changes were adopted during the 2003 - 2004 triennial review that revise the selection criteria for exceptional waters. The categorization criteria for exceptional waters are now contained in 401 KAR 5:030, Section 1.(2)(a).

Kentucky added a "high quality water" category during its 2003 - 2004 triennial review of standards. The eligibility criteria for high quality waters in 401 KAR 5:030, Section 1.(3)(a) are new standards which are subject to review under the provisions of 303(c)(4)(A). Since the Commonwealth now intends that both the exceptional and high quality water categories be considered as waters with quality that "exceed levels necessary to support propagation of fish, shellfish, and wildlife, and recreation in and on the water," EPA reviewed the combined effect of these two categories to ensure that the Commonwealth's rule covers all "high quality" waters protected under 40 CFR 131.12(a)(2).

Kentucky also adopted a new category of “impaired waters” during the 2003 – 2004 triennial review. This category of waters was intended to include only waters that are *not* considered for protection as high quality waters, i.e., waters that do not “exceed levels necessary to support propagation of fish, shellfish, and wildlife, and recreation in and on the water.” The eligibility criteria for the impaired waters category are discussed below.

The combined eligibility criteria for exceptional waters and high quality waters now excludes only waters of the Commonwealth that are: (1) designated as ONRWs, and (2) waters that have been assessed by the Cabinet under CWA section 305(b) authorities as not fully supporting any designated uses. (Note that *all* OSRWs are afforded consideration for protection under the Commonwealth’s high quality water provisions, even though these waters may have been assessed by the Cabinet as not fully supporting designated uses.) The Commonwealth has retained the provisions for the protection and maintenance of ONRWs in KAR 5:030 Section 1.(1), and the Commonwealth adopted new provisions of 401 KAR 5:030 Section 1.(4)(a) in order to specify that assessments made by the Cabinet under the authorities of CWA Section 305(b) would be used for the purposes of identifying “impairment” for the category of impaired waters.

On November 14, 2002, EPA proposed a federal rule for Kentucky to replace the provisions of Kentucky’s antidegradation regulation that were disapproved by EPA on August 7, 1997. In the notice to the proposed federal rule, EPA stated:

Some States use the designational approach to identify high quality waters. Under one type of designational approach, a water body must attain both the aquatic life and recreational uses to be considered a high quality water. For example, a water body that is attaining one of its designated uses (such as aquatic life) would not receive an antidegradation review if the water body were not attaining its other use (such as recreation). EPA has found this approach to be consistent with 40 CFR § 131.12. [67 FR 68977]

EPA has previously found that the selection of high quality waters using either a designational approach or a pollutant-by-pollutant approach could be consistent with the federal requirement at 40 CFR § 131.12(a)(2). In EPA’s Advance Notice of Proposed Rulemaking published on July 7, 1998, EPA stated:

There are advantages and disadvantages to each approach. EPA’s current thinking is that neither approach is clearly superior and that either, when properly implemented, is acceptable. EPA has approved both approaches in State standards. [63 FR 36782]

Kentucky’s combined selection criteria for classification of waters for antidegradation purposes combines some elements of the designational approach and some elements of the pollutant-by-pollutant approach. Qualification for the exceptional waters category is based on meeting certain criteria, which include high levels of biological diversity, recognition of outstanding values through other statutory provisions,

exceptional aesthetic or ecological values, historical significance, or high levels of water quality. This is typically considered as a designational approach.

However, in adopting the category of high quality waters, Kentucky has chosen to create a “default” category that contains *all* other waters of the Commonwealth, unless the water is an ONRW or has been shown to be impaired for a designated use. This approach clearly is not a “designational” approach, since no data are required for a water to be placed in the high quality waters category, and Kentucky does not maintain a listing of high quality waters that have been classified in that category.

Qualification for the impaired waters category (i.e., the only waters of the Commonwealth that are not considered for high quality waters protection, at a minimum) is based solely on a determination by Kentucky that a water body does not meet the 40 CFR § 131.12(a)(2) requirement for waters that “exceed levels necessary to support propagation of fish, shellfish, and wildlife and recreation in and on the water.” (emphasis added). This method of exclusion of waters from consideration as high quality waters combines some concepts of both approaches, in that chemical and biological data are evaluated in making an impairment decision, but the final decision to include waters in this category is based on whether each designated use for the water body is being attained. Kentucky’s categorization approach is similar to the approach approved by EPA Region 4 in Alabama and Tennessee.

The Commonwealth also determined that certain waters, i.e., OSWRs, with an assessment status of “impaired” should also be given consideration for high quality water protection. This decision appears to be in response to comments made during the public participation process, in that commenters asserted that certain waters were “deserving of Tier II protection although they are impaired for one or more pollutant.” The Commonwealth, in creating a new high quality waters category, together with the exceptional waters category, has established an appropriate and sufficiently broad set of eligibility criteria for designating waters to be given high quality water protection under 40 CFR § 131.12(a)(2). EPA also supports the Commonwealth’s decision to assign high quality water protection for OSRWs, regardless of their CWA section 305(b) use assessment status.

With the recent revisions, KDOW added 146 water body segments to Table 2 of Section 1.(2), entitled “Surface Waters Categorized as Exceptional Water.” These segments were categorized as exceptional waters since the 1998 – 1999 triennial review of water quality standards. The total number of segments in Table 2 is now 218, and the total length of these segments is 1438.3 stream miles (excluding three lake/reservoir segments).

Using information from Kentucky’s 2004 CWA section 305(b) Report, EPA estimated the length of stream miles, the number of water bodies, and the percentage of total stream miles in each of the antidegradation categories of waters in effect for Kentucky water quality standards, as revised during the 2003 – 2004 review:

Categories (2004)	Stream Miles	Water Bodies	% of Total Stream Miles
Outstanding national resource waters	29.6	3	0.06
Exceptional waters	1438.3	218	2.9
High Quality waters	42977.3	(All others)	87.5
Impaired waters*	4654.8 **	(Unknown)	9.5

* Any Outstanding State Resource Water in this category is excluded as an impaired water, pursuant to 401 KAR 5:030 Section 1.(3)(a)2), and is included as a high quality water.

** Kentucky's 2004 CWA section 305(b) Report identifies 4,654.8 miles of rivers and streams as not fully supporting designated uses (2,384.8 miles of waters "partially supporting uses," and 2,270.0 miles of waters "not supporting uses") The value reported may include some Outstanding State Resource Waters, which should be listed as high quality waters in the table for 2004 categories.

Under the revised categorization scheme, approximately 90.4 percent of Kentucky stream miles are now characterized in a way that is consistent with the federal requirements for description of high quality waters at 40 CFR § 131.12(a)(2).

PART - 4 DISCUSSION OF EPA'S REVIEW OF THE NEW AND REVISED IMPLEMENTATION PROVISIONS THAT UTILIZE EXISTING CABINET PROGRAMS, DEFAULT EFFLUENT LIMITS, AND TESTS FOR SIGNIFICANCE

This part of the memorandum summarizes EPA's review of eight new provisions of the Commonwealth's procedures for implementation of antidegradation requirements based on existing Cabinet programs, default effluent limitations, or tests for significance, which establish conditions and requirements that serve to provide compliance with the Commonwealth's antidegradation policy at 401 KAR 5:029 Section 1.

(A) 401 KAR 5:030 Section 1.(2)(b)1.a. [for exceptional waters] and Section 1.(3)(b)1.a. [for high quality waters]:

1. Dischargers listed in clauses a through e of this subparagraph are subject to control by existing cabinet programs including the KPDES program. Subparagraphs 2 through 9 for exceptional waters [2 through 6 for high quality waters], of this paragraph shall not apply to those dischargers identified in clauses a through e of this paragraph, except the cabinet shall assure water quality necessary to fully protect existing uses.

a. KPDES general permits for storm water discharge

What information has Kentucky submitted in support of this provision?

The revisions here involve a change to the previously approved provision governing storm water discharges in exceptional waters as well as a new provision, applicable to the newly created category of high quality waters. In the final stages of the Commonwealth's 2003 – 2004 triennial review process, revisions to the December 2003 proposal were made in 401 KAR 5:030, Section 1.(2)(b)1.a. [for exceptional waters] and Section 1.(3)(b)1.a. [for high quality waters]. The provisions of the rule that were under consideration in December 2003 applied to all storm water permits – both individual and general permits. The revisions limited the application of 401 KAR 5:030, Section 1.(2)(b)1.a. and 1.(3)(b)1.a. to *general* storm water discharge permits. The provision for storm water discharges that applies to exceptional waters (renumbered as 401 KAR 5:030, Section 1.(2)(b)1.a.) was revised to apply only to *general* storm water permittees, as opposed to all storm water discharges and a new provision for general storm water permits that discharge to high quality waters (Section 1.(3)(b)1.a.) was adopted by the Commonwealth during the 2004 review.

EPA has reviewed Kentucky's statements concerning the impacts of storm water discharges, as reflected in the standards revisions themselves, responses to questions from EPA in 1995, responses to comments made by the general public in connection with the most recent triennial review, and responses to questions from EPA with respect to the revisions now under review. Kentucky's rule provides that storm water discharges are "subject to control by existing cabinet programs." EPA understands the Commonwealth's position to be that an antidegradation review of discharges under its storm water general permits is not necessary because those permits are intended to authorize only storm water discharges that will have an insignificant lowering of water quality. Furthermore, EPA understands that the Commonwealth intends that any future storm water general permits that it issues for new or expanded discharges into high quality or exceptional waters would allow such discharges only if they would not result in a significant lowering of water quality.

Kentucky first stated its position as to the impacts of storm water discharges in connection with a previous triennial review of its standards. During the triennial review completed by Kentucky in 1995, the following provision was included as part of the Commonwealth's antidegradation policy implementation methodology: "Storm water discharges are exempt from nondegradation implementation procedures for water bodies whose quality exceeds that necessary to support propagation of fish, shellfish, and wildlife and recreation in and on the water, but are subject to control by existing cabinet programs." In a letter dated November 13, 1995, EPA asked KDOW to clarify certain aspects of the Commonwealth's KPDES permitting program for storm water discharges to exceptional waters, stating, "Further, we understand that the Commonwealth does not presently issue general permits for storm water discharges into Tier II waters. Please provide a written description of how the Commonwealth determines what constitutes insignificant degradation to Tier II waters due to a storm water discharge or discharges or an example of this process to assist our review." In a December 8, 1995 letter from Phillip J. Shepard, Secretary, Kentucky Natural Resources and Environmental Protection

Cabinet, to John H. Hankinson, Regional Administrator, EPA Region 4 Office, the Commonwealth responded:

The cabinet can issue general permits for storm water discharges into Tier II waters. These are issued depending upon the facility category. A decision to issue a general permit means that we have determined that the discharge from that type of facility would cause insignificant degradation. An example would be a warehouse where products are stored inside, compared to a bulk chemical storage facility. The latter facility would receive an individual permit with end of pipe technology or water quality based limits.

EPA approved this 1995 storm water provision for exceptional waters on August 7, 1997. This provision was slightly revised in 1999, to read as follows: "Storm water discharges shall be exempt from antidegradation implementation procedures for exceptional waters, but shall be subject to control by existing cabinet programs." The revision was approved in 2000 and remains a part of Kentucky's approved standards, although it will be replaced by the 2004 revisions referenced above as applicable to exceptional waters and high quality waters once approved by EPA.

In a letter dated February 25, 2005 from LaJuana S. Wilcher, Secretary, Environmental and Public Protection Cabinet to Jim Giattina, Director, Water Management Division, EPA Region 4, Kentucky provided information on its experience with the application of the earlier provisions in the context of exceptional waters. In the letter, the Commonwealth stated, "Of more than 2000 general stormwater permits, 14 were found to discharge into or upstream of nine exceptional waters. These waters are exceptional even with these discharges; therefore, we consider their impact to be de minimis." Of the nine streams for which data were reported by Kentucky, one exceptional water has three storm water discharges upstream of the exceptional water segment, and one exceptional water has four storm water discharges upstream of the exceptional water segment.

What is EPA's conclusion on whether 401 KAR 5:030 Sec.1(2)(b)1.a. [exceptional waters] and Sec.1(3)(b)1.a. [high quality waters] comply with 40 CFR Section 131.12(a)(2)?

EPA concludes that these provisions are consistent with 40 CFR Section 131.12(a)(2). While EPA's antidegradation policy, which has been adopted by Kentucky [401 KAR 5:029 Section 1.], requires an antidegradation review in connection with lowering of water quality in high quality waters, EPA has also recognized flexibility in states' implementation of antidegradation requirements, e.g., to allow some lowering of water quality that would not be subjected to antidegradation review. In this regard, it is important to note that only new or expanding discharges are subject to antidegradation review under EPA's regulations, because only these types of discharges -- as opposed to discharges authorized to occur at existing levels -- would be expected to result in a lowering of water quality. By providing that antidegradation review is not required for storm water general permits, Kentucky has represented that it will assure that these

general permits will authorize only those new or expanded discharges that will not cause significant lowering of water quality. Based on that understanding, EPA approves these provisions as revisions to Kentucky's water quality standards.

What is the background for EPA's conclusion that 401 KAR 5:030 Sec. 1(2)(b)1.a. [exceptional waters] and Sec.1(3)(b)1.a. [high quality waters] comply with the requirements of 40 C.F.R. Section 131.12(a)(2)?

Kentucky's antidegradation policy requires that high quality waters must be maintained unless the Cabinet makes a finding allowing a lowering of water quality. Kentucky's antidegradation policy (401 KAR 5:029 Sec.1(2)) provides that:

Where the quality of surface waters exceeds that necessary to support propagation of fish, shellfish, wildlife, and recreation in and on the water, that quality shall be maintained and protected unless the cabinet finds, after full satisfaction of the intergovernmental coordination and public participation provisions of the cabinet's continuing planning process, that allowing lower water quality is necessary to accommodate important economic or social development in the area in which the waters are located.

This policy applies to all high quality waters. In implementing this policy, the principal requirement is that high quality and exceptional waters shall be maintained and protected. Significant lowering of water quality can occur only if the Cabinet makes a finding that such lowering is necessary to accommodate important social and economic development in the area in which the waters are located.

EPA has recognized that states have some flexibility in implementing antidegradation requirements to allow for situations where the impact of an activity on water quality may be considered to be de minimis or insignificant. These impacts are not subject to antidegradation review under EPA's regulations. On July 7, 1998, EPA published an Advance Notice of Proposed Rulemaking for the federal water quality standards regulation. In that notice, EPA discussed issues relating to states' flexibility in implementing antidegradation for high quality waters in determining whether the degree of lowering of water quality rises to the level of significant degradation and therefore warrants further review. EPA stated, in pertinent part:

Although not discussed in 40 C.F.R. Section 131.12 of the water quality standards regulation, State and on occasion Tribal tier 2 implementation procedures often include guidelines which are used to determine when the water quality degradation that will result from a proposed activity is significant enough to warrant further antidegradation review. When the degradation is not significant, the antidegradation is typically terminated. The significance evaluation is usually conducted on a pollutant-by-pollutant basis, even where a water body-by-water body approach is used to identify high quality waters and significant degradation for any one pollutant triggers further review for that pollutant.

Applying antidegradation requirements only to activities that will result in significant degradation is a useful approach that allows States and Tribes to focus limited resources where they may result in the greatest environmental protection. [63 FR 36783]]

Also, EPA's Water Quality Initiative for the Great Lakes (Water Quality Guidance for the Great Lakes System: Supplementary Information Document (SID), EPA-820-B-95-001, March 1995, p. 205) addresses the concept of de minimis lowering in relation to antidegradation implementation:

For high quality waters, the proposed Guidance defined the concepts of de minimis lowering of water quality and significant lowering of water quality. The implementation procedures recognized that considerable variation was possible in the effects of different activities on water quality. The proposed Guidance included a mechanism for distinguishing between activities based on the extent to which water quality was anticipated to be lowered. Small reductions in water quality were identified as de minimis and not subject to antidegradation review. Both concepts were intended as mechanisms to allow Tribes and States to differentiate between activities that are likely to have an inconsequential effect on water quality and those that are likely to have significant effects and to focus their efforts on those that are of the most consequence to water quality.

These excerpts demonstrate that the Agency has afforded states and tribes some flexibility in implementing antidegradation requirements consistent with the concept of insignificant degradation.

Kentucky has chosen to exercise this flexibility with respect to storm water general permits that it will issue for discharges to its new category of high quality waters as well as its category of exceptional waters. The antidegradation implementation procedures that Kentucky has adopted do not require that an antidegradation review be conducted of discharges into Tier 2 waters under its storm water general permits because the Commonwealth has determined that it will instead assure that such permits only allow discharges that will not cause a significant lowering of water quality.

Kentucky's current storm water general permits include a provision that an antidegradation review will not be required for discharges covered by those permits. When Kentucky issued those permits in 2002, Kentucky had only a limited number of waters (Kentucky's exceptional waters) for which water quality could not be lowered without a Cabinet finding authorizing such lowering. As discussed above, Kentucky provided information to EPA supporting Kentucky's position that significant lowering of water quality has not occurred in its exceptional waters as a result of discharges authorized by its storm water permits. Most of Kentucky's current storm water general permits do not authorize discharges to exceptional waters. Such discharges may be authorized by individual permits if not covered by general permits. Kentucky's adoption of its new categorization of high quality waters extends the antidegradation policy's protections to a large number of additional waters. Therefore, when Kentucky reissues

its storm water general permits, Kentucky's new implementation procedures (which provide that no antidegradation review will be required) for new or expanded discharges into those waters mean that Kentucky will assure that its permits will not allow discharges that would cause a significant lowering of water quality.

EPA finds the subject provisions protective under these circumstances and hereby approves them. EPA commits to work closely with Kentucky as they develop their future storm water general permits in light of these revised water quality provisions.

(B) 401 KAR 5:030 Section 1.(2)(b)1.b. [for exceptional waters] and Section 1.(3)(b)1.b. [for high quality waters]:

1. Dischargers listed in clauses a through e of this subparagraph are subject to control by existing cabinet programs including the KPDES program. Subparagraphs 2 through 9 for exceptional waters [2 through 6 for high quality waters], of this paragraph shall not apply to those dischargers identified in clauses a through e of this paragraph, except the cabinet shall assure water quality necessary to fully protect existing uses.

b. Coal mining discharge subject to regulation under the Surface Mining Control and Reclamation Act and 33 U.S.C. 1344

What information has Kentucky submitted in support of this provision?

This is a new provision of Kentucky's antidegradation procedures and it applies to the categories of high quality waters and exceptional waters. Kentucky submitted information to describe how existing authorities serve as the process to implement Kentucky's antidegradation requirements in 401 KAR 5:029 Section 1 for discharges from coal mining activities. These existing authorities include: 1) the KPDES permitting program (CWA section 402); 2) the Surface Mining Control and Reclamation Act (SMCRA) program, and 3) the CWA section 404 program.

The Commonwealth submitted the revised procedures for coal mining discharges on September 23, 2004. Kentucky also adopted a Statement of Consideration on December 4, 2003, referencing this provision, among others. EPA and Kentucky had extensive discussions regarding these procedures over a period of 11 months. On February 25, 2005, LaJuana S. Wilcher, Secretary, Kentucky Environmental and Public Protection Cabinet, submitted to Jim Giattina, Director, EPA Region 4 Water Management Division, a letter with additional information and clarification on the procedures for coal mining discharges. In the attachment to the letter (pp. 8 – 13), Kentucky explains how it will utilize regulatory requirements under CWA section 402, CWA section 404, and the Cabinet's permitting program for coal mining under its SMCRA authority to address the requirements of the antidegradation policy for high quality waters, including, the evaluation of alternatives, the review of socioeconomic importance, public participation, and documentation of a final antidegradation determination.

The February 25 letter explains that the Commonwealth's process includes several components:

- 1) A newly-created entity, the Kentucky Coal Water Task Force as a process for evaluating coal mining activities;
- 2) Review of alternatives to the lowering of water quality;
- 3) Review of social and economic importance;
- 4) Public participation on the Cabinet's proposed decision; and
- 5) A final determination of the need and importance of the lowering of water quality.

Each of these is summarized below.

1) The Kentucky Coal Water Task Force

A newly-created entity, the Kentucky Coal Water Task Force, will coordinate the review processes of the Kentucky Department of Natural Resources (KDNR) and the KDOW for these actions. The Task Force will include members from KDNR and KDOW, and its purpose is "to foster communications between the two organizations with respect to water issues and develop a seamless working relationship between the two Departments." The Task Force will address issues such as coordination of the Commonwealth's regulatory programs that address coal mining operations, and will report to the Commissioner of Natural Resources, Commissioner of Environmental Protection, and the Office of the Secretary. The Task Force will also ensure that outcomes resulting from the CWA section 404 permitting process are included in the Commonwealth's antidegradation evaluation to "effectively analyze and impose alternatives for the purposes of Kentucky's antidegradation program." Kentucky's process is summarized below.

2) Alternatives Analysis and Impact Minimization

To determine whether the proposed lowering of water quality is "necessary," KDOW will rely on the information gathered by the Division of Mine Permits of the KDNR under the Surface Mining Reclamation and Control Act (SMCRA), the Department of Environmental Protection's (DEP's) KPDES and CWA section 401 water quality programs, as well as information provided by the Corps of Engineers. According to Kentucky, coal mining operations are regulated under SMCRA by the KDNR through individual permits. In the February 25, 2005 letter from LaJuana Wilcher, Secretary of the Kentucky Environmental and Public Protection Cabinet, to Jim Giattina, EPA Region 4 Water Management Division Director, Kentucky stated that DEP reviews SMCRA permit applications "to ensure that all regulatory standards of operation are addressed and

alternatives [are considered] to minimize impacts to the environment and to protect water quality. ... Every facet of a coal mine's operation is analyzed in order to minimize the overall impact of the resource extraction." In the letter, Kentucky also states:

Alternatives to be considered, where appropriate, include but are not limited to, minimization of disturbance, including the size of the fills and the utilization of rock check dams between the toe of the fill and the sediment pond, strategic placement of straw bales and silt fences, aggressive reclamation plans, such as vegetative selection and planting schedules, siting requirements, and scheduling of activities. In summary, DNR analyzes numerous alternatives, above and beyond that necessary to achieve effluent limitations.

In addition to the evaluation of alternatives in the SMCRA permitting process, KDOW plans to incorporate any information available on alternatives analyses conducted under the CWA section 404 permitting process. Kentucky states, "The Corps requires an alternatives analysis for proposed hollow fills and slurry impoundments for individual permit applications and has the ability to require an alternatives analysis for the Nationwide 21 applications, in order to determine if there is another feasible alternative to the proposed structure." Kentucky reviews CWA section 404 individual permits in order to certify that the actions authorized in the CWA section 404 permit are sufficient to meet applicable water quality standards.

At the time that a CWA section 402 permit application or a notice of intent (NOI) for coverage under a general permit is reviewed, KDOW will make a determination whether the lowering of water quality to be authorized by the CWA section 402 permit is necessary, i.e., that there are no alternatives to the lowering. As discussed above, in their letter of February 25, 2005, Kentucky explained that they expected that the record from the SMCRA permit process, would provide sufficient information for KDOW to make the alternatives analysis regarding the potential lowering of water quality during the CWA section 402 process. The letter states that "KDOW will review the record prepared during the SMCRA review and KDOW will consider other alternatives including avoidance before authorization to discharge under CWA section 402 is granted." Letter at 11. KDOW will then take public comment on its proposed determination and the adequacy of the record supporting that determination. KDOW will issue a final permit decision after considering public comment.

3) Socioeconomic Review

To determine whether the proposed lowering of water quality is "important to the area in which the waters are located," Kentucky will conduct a review of social and economic information for coal mining discharges obtained during the KPDES permitting process. Kentucky will review each application (for individual permits) or NOI (for general permits) to determine: (1) whether the discharge is proposed for an exceptional or high quality water, (2) whether there will be a lowering of water quality, and (3) whether the lowering is justified and meets the requirements of the Commonwealth's antidegradation policy at 401 KAR 5:029 Section 1. If KDOW determines there will be a

lowering of water quality and an antidegradation review is required, KDOW will send the applicant or notifier a questionnaire "requesting information regarding the social and economic development generated by the facility." This information will be used by KDOW to make the necessary determination. If the application or NOI is not complete, KDOW "may determine whether it has the information necessary to make the finding of economic or social importance," and "will notify the applicant or notifier [if] the application is incomplete." No permit can be issued if the permit application is not complete.

Public Participation/Intergovernmental Coordination

Kentucky will solicit comments on KDOW's tentative antidegradation determination by sending a notice to the list of persons who have notified KDOW of interest in actions taken under the KPDES permitting program. The notice will also be sent to "the applicant; state and federal agencies with jurisdiction over fish and shellfish, and wildlife resources including U.S. Fish and Wildlife and Kentucky Department of Fish and Wildlife; the state's historic preservation officer; and the U.S. Army Corps of Engineers." The notice will also be available on the Cabinet's website.

The notification will provide for a 30-day comment period and will explain where the public can obtain information regarding KDOW's antidegradation evaluation, which includes the alternatives analysis and the socioeconomic determination. This determination will include "the record of KDOW's analysis of alternatives conducted during the KDNR SMCRA permitting process, and information submitted by the applicant on the social or economic importance of the activity."

Final Antidegradation Determination

After reviewing the evaluation of alternatives and the socioeconomic information, KDOW will decide whether to allow the lowering of water quality. Kentucky will review all comments submitted during the public participation process conducted under the CWA section 402 KPDES individual permit or NOI review. KDOW will decide "either [to] grant or deny authorization for the [CWA section] 402 discharge under the general permit or accept or reject the application for an individual [CWA section] 402 permit." The CWA section 402 KPDES permit is issued after the CWA section 404 permit and SMCRA permits are authorized. All SMCRA permits issued by the Division of Mine Permits include a condition that "all other authorizations (i.e., [CWA sections] 404, 402) must be granted before authorization under the SMCRA permit is effective." CWA section 404 permits require authorization under SMCRA before discharge may begin. In this way, KDOW's decision to grant or deny the permit under the CWA section 402 KPDES process is the Commonwealth's final decision regarding whether the discharge has met the antidegradation requirements.

What is EPA's conclusion on whether 401 KAR 5:030 Section 1.(2)(b)1.c. [for exceptional waters] and Section 1.(3)(b)1.c. [for high quality waters] comply with the requirements of 40 CFR § 131.12?

Based on information and clarifications provided by Kentucky in its letter dated February 25, 2005, EPA concludes that the existing Cabinet programs under SMCRA and CWA section 402 provide a decision making process that is consistent with the requirements of 40 CFR § 131.12(a)(2) for discharges from coal mining activities. EPA approves this new provision of Kentucky's implementation procedures.

What is the background for EPA's conclusion that 401 KAR 5:030 Section 1.(2)(b)1.c. [for exceptional waters] and Section 1.(3)(b)1.c. [for high quality waters] comply with the requirements of 40 CFR § 131.12?

Kentucky's process, as outlined in Kentucky's February 25, 2005 letter, addresses the components of the federal antidegradation policy at 40 CFR § 131.12(a)(2). This letter also includes, as Attachment 6, a listing of current regulatory authorities that relate to the decision process for coal mines. The February 25, 2005 letter also provides a determination by the Executive Director of the Office of Legal Services of the Kentucky Environmental and Public Protection Cabinet that the processes outlined in the letter "are consistent with the antidegradation regulations adopted by the Commonwealth and that the statutory and regulatory authorities referenced in that attachment [to the February 25, 2005 letter] are available and will allow the cabinet to complete the antidegradation review, as set forth in that attachment."

1) The Kentucky Coal Water Task Force

EPA finds that the Kentucky Coal Water Task Force establishes a reasonable coordination mechanism for considering the various components of the antidegradation review conducted under CWA section 404, SMCRA, and CWA section 402. The establishment of the Task Force should enhance the quality of the Commonwealth's review of coal mining discharges, including implementation of the newly adopted antidegradation implementation procedures.

2) Alternatives Analysis and Impact Minimization

On July 7, 1998, EPA, in an Advance Notice of Proposed Rulemaking on 40 CFR Part 131, i.e. the federal water quality standards regulation, described the intent of a state analysis to determine if lowering of water quality is "necessary." In that notice, EPA stated:

The water quality standards regulation requires that the water quality of high quality waters not be lowered unless the State or Tribe determines that such degradation is necessary to accommodate important social and economic development. Given the variety of available engineering approaches to pollution control and the emerging importance of pollution prevention, the finding of necessity is among the most important and useful aspects of an antidegradation program and potentially an extremely useful tool in the context of watershed planning. An approach that has been recommended by EPA is to require the

proponent of the proposed activity to develop an analysis of pollution control/pollution prevention alternatives. In conducting its antidegradation review, the State or Tribe then ensures that all feasible alternatives to allowing the degradation have been adequately evaluated, and that the least degrading reasonable alternative is implemented. Also, note that where less-degrading alternatives are more costly than the pollution controls associated with the proposal, the State or Tribe should determine whether the costs of the less-degrading alternatives are reasonable. EPA believes that such an alternatives approach can be an effective tool for maintaining and protecting existing assimilative capacity. [63 FR 36784]

Kentucky's implementation of three different overlapping statutory and regulatory requirements allows the Commonwealth to evaluate alternatives and effectuate impact minimization consistent with the requirements of the federal antidegradation policy for discharges from coal mining wastewater as well the activities that occur in the construction and active mining phases at sites proposed for CWA section 402 permitting.

The requirements under the Commonwealth's SMCRA program at 405 KAR 8/16/001 address technologies that "minimize, to the extent possible, disturbances and adverse impact on fish, wildlife and related environmental values and achieve enhancement of those resources when practicable." In meeting the minimization requirement, the statute requires consideration of "equipment, devices, systems, methods, or techniques which are currently available anywhere as determined by the Cabinet, even if they are not in routine use," as well as "construction practices, siting requirements ... scheduling of activities and design of sedimentation ponds" in the issuance of a permit under this regulation. In the letter dated February 25, 2005, Kentucky stated, "Changes to the mining plan [for individual permits] are required when conditions dictate that an alternative approach is necessary to minimize impact to all waters of the Commonwealth." Kentucky also stated that "The KDOW will evaluate avoidance of in-stream disturbance alternatives in high quality streams."

Kentucky has stated that this antidegradation review will incorporate any findings of the review conducted by the Corps of Engineers under the "Standard Operating Procedures for Nationwide Permit 21, Surface Coal Mining Activities, Review and Evaluation of Pre-Construction Notifications, and Minimal Adverse Effects Determinations" (the Corps' SOP). In order to be complete, an applicant's CWA section 404 preconstruction notification must include certain information to allow a determination if a project will result in minimal adverse environmental effects on the aquatic environment. The following excerpt from Section 2.b. of the Corps' SOP describes some of the information that may be required as part of the preconstruction notification package.

(3) A discussion of how the project has been designed and constructed to avoid and minimize adverse effects to waters of the United States to the extent practicable at the site. This discussion may include, but not limited to, the following:

(a) Demonstration that there is not a practicable alternative in waters of the U.S., including other alternatives that were considered

(b) Discussion of how impacts to waters of the U.S. have been avoided and minimized

(c) Avoidance of high quality waters

(d) Demonstration that sedimentation control structures will be located as close as practical to the fill(s) and/or mining area with which it is associated ...

(4) Cumulative impacts analysis that must include an evaluation of the impact on the environment that results from the incremental impact of the proposed activity when added to other past, present and reasonably foreseeable future actions regardless of what agency or person undertakes them. An example would be to consider other land disturbance activities and watershed improvement projects within the same watershed as the proposed activity on water quality and aquatic habitat.

We have determined that Kentucky's approach for considering alternatives is consistent with the requirements of the federal antidegradation policy.

3) Socioeconomic Review

EPA also discussed the issue of identification of important social or economic activities in the Advance Notice of Proposed Rulemaking published in the Federal Register on July 7, 1998. In that notice, EPA stated:

Another task that must be completed as part of an antidegradation review is to evaluate whether a proposed activity that will result in degradation is necessary to accommodate important social or economic development in the area in which the waters are located. (40 CFR 131.12(a)(2)). The significance of determining if an activity will provide for important social or economic benefit is that, absent important social or economic benefit, degradation under tier 2 must not be allowed. Factors that may be addressed in such an evaluation include: (a) employment (i.e., increasing, maintaining, or avoiding a reduction in employment), (b) increase production, (c) improved community tax base, (d) housing, and (e) correction of an environmental or public health problem. Some States or Tribes have addressed this issue by requiring the applicant to bear the burden of demonstrating the social and economic importance of the proposed activity. However, approaches for evaluating social and economic importance vary widely. ... EPA's current thinking is that determining the social and economic importance of a proposed activity is an important public question best

addressed by State, Tribal or local interests, perhaps as part of the development of a basin plan. [63 FR 36784]

Kentucky will use the application for discharge under the KPDES program to request relevant socioeconomic information related to the proposed activity. In the letter dated February 25, 2005, Kentucky described the process to gather and review socioeconomic information related to the proposed mining activity. If the information is not supplied by the applicant or notifier, KDOW will determine whether it has the information necessary to make the finding of economic or social importance, or notify the applicant or notifier that the application is incomplete, and that a decision on the application cannot be made.

In Kentucky's August 10, 2004, and February 25, 2005 letters to EPA, Kentucky described certain factors that could be used in the socioeconomic evaluation of individual coal mining operations. These include: 1) the number of employees directly or indirectly employed by the coal mining industry; 2) taxes generated by coal mining, and 3) the return of coal severance taxes to counties where mining occurs. These factors are similar to those discussed by EPA in the July 7, 1998 Advance Notice of Proposed Rulemaking as socioeconomic factors related to commercial facilities, i.e., non-domestic entities.

We have determined that Kentucky's approach for review of socioeconomic information is consistent with the requirements of the federal antidegradation policy.

4) Public Participation/Intergovernmental Coordination

Kentucky has described the process for public notice and review of a tentative high quality water/exceptional water antidegradation determination for both individual and general KPDES permits. KDOW will solicit comments (by letter) for 30 days from individuals and groups who have notified KDOW of interest in actions taken under the KPDES permitting program. The notice of the proposed permit and determination will also be published on the Cabinet's website, and the notice will also be sent to "the applicant; state and federal agencies with jurisdiction over fish and shellfish, and wildlife resources including U.S. Fish and Wildlife Service and Kentucky Department of Fish and Wildlife; the state's historic preservation officer; and the U.S. Army Corps of Engineers." The notice will explain where the details of KDOW's tentative determination can be found, including the record relating to the alternatives analysis and socioeconomic information in support of the tentative decision.

We have determined that Kentucky's approach for incorporating public review and comment, as well as intergovernmental coordination, is consistent with the federal antidegradation policy.

5) Final Antidegradation Determination

The final step in the Commonwealth's antidegradation review of discharges from coal mines is a determination by KDOW to either grant or deny authorization for the

CWA section 402 discharge. Since the SMCRA permit is authorized on the condition that the CWA section 402 KPDES permit is issued, and the CWA section 404 permit is authorized on the condition that the SMCRA permit is issued, activities authorized under these permits are contingent upon issuance of the final decision under the KPDES permit. In this way, discharges from coal mining activities will not occur until KDOW determines whether the discharge is to a high quality water, and if so, whether that activity is "necessary and important."

We have determined that Kentucky's approach for making and announcing a final determination is consistent the federal antidegradation policy.

(C) 401 KAR 5:030 Section 1.(2)(b)1.c. [for exceptional waters] and Section 1.(3)(b)1.c. [for high quality waters]:

1. Dischargers listed in clauses a through e of this subparagraph are subject to control by existing cabinet programs including the KPDES program. Subparagraphs 2 through 9 for exceptional waters [2 through 6 for high quality waters], of this paragraph shall not apply to those dischargers identified in clauses a through e of this paragraph, except the cabinet shall assure water quality necessary to fully protect existing uses.

c. Domestic sewage discharge from a single-family residence

What information has Kentucky submitted in support of this provision?

This new provision of Kentucky's standards was adopted in 2004 for the categories of high quality waters and exceptional waters. On August 14, 2002, the Commonwealth reissued a general KPDES permit, "Individual Residences General Permit," (KYG400000) which states:

Only dischargers which have satisfied the application requirements of this general permit, have received construction approval, and have not been required by the DOW to apply for an individual permit, are authorized to discharge by this general permit. The receiving waters for the discharge(s) described in the permit application submitted pursuant to KRS Chapter 224, are located within the political boundaries of the Commonwealth of Kentucky, and the permittee is authorized to discharge in accordance with approved plans and specifications indicative of the following minimum treatment technology: extended aeration plus sand filtration plus disinfection.

Kentucky, in a letter dated February 25, 2005 from LaJuana S. Wilcher, Secretary of the Kentucky Environmental and Public Protection Cabinet, to Jim Giattina, Director of EPA Region 4 Water Management Division, clarified that "Kentucky does not issue individual permits to single-family residences. An application is either granted for general permit coverage or is denied."

In a letter dated August 10, 2004, from LaJuana S. Wilcher, Secretary of the Kentucky Environmental and Public Protection Cabinet to Jim Giattina, Director of EPA Region 4 Water Management Division, the Commonwealth stated:

With respect to single-family residences, Kentucky has a strict statute requiring single-family residences to have waste treatment capability before an electrical hookup can be approved. In addition, the agency provides the service for the homeowners of looking at alternatives before concluding that a treated surface water discharge is necessary.

In the December 4, 2003 "Statement of Consideration," for the adoption of new and revised provisions of Kentucky water quality standards during the 2003 – 2004 triennial review, KDOW also stated:

With regard to domestic sewage, alternatives to domestic sewage discharges from single-family residences are evaluated by the discharger and the cabinet prior to issuance of a KPDES permit. Applicants must check with local health departments to determine if on-site systems are feasible, and the cabinet investigates connection to a larger system, spray irrigation, etc., prior to approval of a home discharge treatment unit. The cabinet may also deny these discharges.

In addition, in a letter dated February 25, 2005, from LaJuana S. Wilcher, Secretary, Kentucky Environmental and Public Protection Cabinet, to Jim Giattina, Director, EPA Region 4 Water Management Division, Kentucky further described the rationale used in adopting this provision:

The Division of Water as a matter of practice also takes a conservative view toward authorizing the discharge from a single family residence. This evaluation considers alternatives and socio-economic concerns for this category of discharges. A single family residence must first exhaust the options (i.e., alternatives analysis) of connection to a large sewer system or the ability to treat with an onsite system (septic tank, lateral system, spray field, etc.) before it is considered for a discharge system permitted under the KPDES program.

Once the options are evaluated, the proposed discharge is then further weighed against water quality concerns to determine whether the proposed discharge is approvable. Where a discharge has the potential to add to an existing impairment or lower existing water quality, the proposed discharge may be denied. Otherwise, the proposed discharge is permitted. Often, this permitted activity is an improvement over an existing "straight-pipe" or untreated discharge.

Discharges from single family residences generally only have the potential to affect water quality in the immediate vicinity of the residence itself. This is due to the small volume of wastewater discharged that often does not migrate beyond the immediate vicinity of the residence and could be considered as de-minimis impact not requiring further antidegradation analysis.

This general KPDES permit for discharges from individual residences includes the following provisions and effluent limitations:

<u>Parameter</u>	<u>Monthly Average</u>	<u>Daily Maximum</u>
5-day Biochemical Oxygen Demand	30 mg/l	60 mg/l
Total Suspended Solids	30 mg/l	60 mg/l
Ammonia Nitrogen	20 mg/l	40 mg/l

Dissolved Oxygen – Shall not be less than 2 mg/l

Disposal of oil and grease and household chemicals (such as paint, herbicides, pesticides, and cleaning compounds) into the wastewater system is prohibited due to the potential to reduce the treatment efficiency and cause violations of water quality standards.

This treatment unit is temporary and in no way supersedes the need of a regional sewer system. The permittee will eliminate the discharge and treatment unit by connection to a regional sewer system when it becomes available.

In applying for coverage under this general permit, an applicant located in a regional facility planning area must submit a letter from the planning authority stating that connection to a regional facility is not available, and also that the proposed treatment system is "compatible with the regional facility plan."

What is EPA's conclusion on whether 401 KAR 5:030 Section 1.(2)(b)1.c. [for exceptional waters] and Section 1.(3)(b)1.c. [for high quality waters] comply with the requirements of 40 CFR § 131.12?

EPA has concluded that the process established by the Commonwealth for permitting domestic sewage from single family residences satisfies the requirements of 40 CFR § 131.12(a)(2). Kentucky's KPDES approach is reasonable for implementation of the antidegradation policy for these discharges.

What is the background for EPA's conclusion that 401 KAR 5:030 Section 1.(2)(b)1.c. [for exceptional waters] and Section 1.(3)(b)1.c. [for high quality waters] comply with the requirements of 40 CFR § 131.12?

Prior to authorization to discharge under the provisions of the general permit, KDW conducts an analysis to determine if connection to a regional wastewater treatment facility is available, or other alternatives, including on-site non-discharging systems or spray irrigation, are feasible in lieu of the discharge. In addition, the Cabinet

may deny coverage under the general permit and require the applicant to eliminate the direct discharge if connection to a regional sewer system becomes available in the future.

The Commonwealth's general permit for discharge from a residence includes a requirement for protection of public health, in that plans and specifications must include a disinfection process prior to discharge. KAR 5:030 Section 1. also states, "These antidegradation procedures shall not preempt the power or authority of a local government to provide by ordinance for a higher level of protection through antidegradation implementation for a discharger located within that local government's jurisdiction to a surface water of the Commonwealth." In reviewing this new provision of Kentucky water quality standards, EPA assumes that the construction of a single family residence has been permitted according to local ordinances and land use and/or zoning plans, where those types of controls apply.

The general KPDES permit, in conjunction with the additional review of the discharge conducted by the Cabinet, provide for an adequate consideration of alternatives to a proposed discharge, as well as the importance of, a proposed discharge from a single-family residence. The federal antidegradation requirement that covered discharges undergo a socio-economic review is not well suited for the evaluation of discharges from single-family residences. However, as acknowledged by EPA in an Advance Notice of Proposed Rule Making for the 40 CFR Part 131 regulation (see 63 FR. 36784), and in the proposed federal antidegradation regulation for Kentucky (see 67 FR 68980), the protection of public health and consideration of residential growth, i.e., housing, are two factors that may be considered by states in determining the importance of social development.

Public participation occurs during the KPDES permit issuance process. During that process, the public may comment on this approach to addressing antidegradation requirements. This approach for providing public participation seems reasonable, given the level of detail in the general permit.

(D) 401 KAR 5:030 Section 1.(2)(b)1.d. [for exceptional waters] and Section 1.(3)(b)1.d. [for high quality waters]:

1. Dischargers listed in clauses a through e of this subparagraph are subject to control by existing cabinet programs including the KPDES program. Subparagraphs 2 through 9 for exceptional waters [2 through 6 for high quality waters], shall not apply to those dischargers identified in clauses a through e of this paragraph, except the cabinet shall assure water quality necessary to fully protect existing uses.

d. Concentrated animal feeding operations

What information has Kentucky submitted in support of this provision?

On October 13, 2000, the Commonwealth issued general KPDES permits for the following types of concentrated animal feeding operations (CAFOs):

- Beef Feeding Facilities
- Swine Feeding Facilities
- Poultry Facilities
- Dairy Facilities

These general permits specifically exclude from coverage the following operations that:

- Are subject to an existing individual KPDES permit.

- The Director has determined to be or may reasonably be expected to be contributing to a violation of a water quality standard or to the impairment of a 303(d) listed basin. Such CAFOs will be required to submit an application for an individual permit.

- Could discharge into surface water that has been classified as an Exceptional or Outstanding State or National Resource Water. Such CAFOs will be required to submit an application for an individual KPDES permit.

- Are in excess of 1,500 animal units. Such CAFOs will be required to submit an application for an individual KPDES permit.

The effluent limitations for discharge from facilities authorized by these four general permits are as follows:

- There shall be no discharge of process wastewater from animal waste retention structures, animal holding areas, or land application areas with the following exception: Process wastewater may be discharged whenever rainfall events, either chronic or catastrophic, cause an overflow of process wastewater from a facility designed, constructed, and operated to contain all process generated wastewater plus the runoff from a 25-year, 24-hour rainfall event. Any such discharge shall be monitored in accordance with the monitoring requirements below. . .

- Process wastewater includes any process generated wastewater and any precipitation (rain or snow) which comes into contact with any manure, litter or bedding, or any other raw material or intermediate product used in or resulting from the production of animals or poultry or direct products (e.g., milk, eggs).

The requirement for “no discharge” of process wastewater from these facilities is based on 40 CFR Part 412, Subparts C and D. This regulation sets forth effluent limitations guidelines and standards for the concentrated animal feeding operations point source category.

Part IV of these permits contains best management practices (BMPs) that specify siting criteria for the construction of land application areas, barns and lagoons. These criteria are based on setback features, e.g., dwellings, parks, city limits, water bodies or karst features, roadways, or downstream public water supply intakes, and a requirement that permittee develop and maintain comprehensive nutrient management plan. The permit requires that the plan use the most recent Natural Resource Conservation Service guidelines or equivalent for waste management. The permit also incorporates all applicable BMPs as set out in the Agriculture Water Quality Plan. These requirements provide control of possible adverse effects, i.e., both water quality- and non-water quality-based effects, from the operation of feedlot facilities.

Kentucky has issued 13 individual KPDES permits for CAFO facilities, and the requirements for these individual permits are substantially similar to those for the general KPDES permit for CAFOs.

On December 4, 2003, Kentucky issued a "Statement of Consideration," for the adoption of new and revised provisions of Kentucky water quality standards during the 2003 – 2004 triennial review. KDOW stated that antidegradation requirements for high quality waters for certain categories are "addressed in various regulatory program areas. Short-term and intermittent discharges of pollutants are more effectively addressed in these other program areas." KDOW also stated that CAFOs are "no discharge facilities," and also that "the cabinet believes this is protective of high quality waters."

In addition, in a letter dated February 25, 2005, from LaJuana S. Wilcher, Secretary, Kentucky Environmental and Public Protection Cabinet, to Jim Giattina, Director, EPA Region 4 Water Management Division, Kentucky further described the rationale used in adopting this provision for CAFOs:

This no discharge requirement ... presumes no significant lowering of water quality associated with a permitted facility. Additionally, no discharge is considered the best alternative available for these facilities. Therefore, the agency has determined that new and expanded CAFOs require no further antidegradation analysis.

What is EPA's conclusion on whether 401 KAR 5:030 Section 1.(2)(b)1.d. [for exceptional waters] and Section 1.(3)(b)1.d. [for high quality waters] comply with the requirements of 40 CFR § 131.12?

EPA concludes that this provision is consistent with 40 CFR Section 131.12(a)(2). While EPA's antidegradation policy, which has been adopted by Kentucky, requires an antidegradation review in connection with lowering of water quality in high quality waters, EPA has also recognized flexibility in states' implementation of antidegradation requirements, e.g., to allow some lowering of water quality that would not be subjected to antidegradation review. In this regard, it is important to note that only new or increasing discharges are subject to antidegradation review under EPA's regulations, because only

these types of discharges – as opposed to discharges authorized to occur at existing levels – would be expected to result in a lowering of water quality. By providing that antidegradation review is not required for discharges from CAFOs, Kentucky has represented that it will assure that these KPDES permits (both individual and general permits) will authorize only those new or increased discharges that will not cause significant lowering of water quality. Based on that understanding, EPA approves these provisions as revisions to Kentucky's water quality standards.

What is the background for EPA's conclusion that 401 KAR 5:030 Section 1.(2)(b)1.d. [for exceptional waters] and Section 1.(3)(b)1.d. [for high quality waters] comply with the requirements of 40 CFR § 131.12?

During the development of effluent limitations guidelines for CAFOs, EPA evaluated alternative treatment and disposal options. EPA concluded that the best available technology economically achievable for existing CAFO discharges (and the best available demonstrated control technology for most new CAFO discharges) should be based on retaining process wastewater, with no discharge allowed except during certain rainfall events. Accordingly, under the regulations, all new sources (except those sources in the swine, poultry and veal calves CAFOs subcategory) and all existing CAFOs are subject to the 24-hour, 25-year storm standard. This means that discharge from these facilities is allowed when precipitation causes an overflow from the production area that is designed to contain all manure, process water, and runoff directly from a 24-hour rainfall event that is expected once in 25 years. New sources in the swine, poultry and veal calves CAFOs subcategory are allowed no discharge, regardless of storm size. See 40 CFR § 412.46(a) (Subpart D). The regulations for this subcategory also provide that construction and operation of facilities that contain all manure, precipitation runoff, and direct precipitation from a 24-hour, 100-year storm will fulfill that requirement. 40 C.F.R. § 412.46(a)(1). The Second Circuit has remanded the 24-hour, 100-year provision to EPA for further explanation and justification in the record. See Waterkeeper Alliance, et al. v. U.S. Environmental Protection Agency, 399 F.3d 486, WL 453139, at *27 (Feb. 28, 2005 2nd Cir.).

EPA understands that the Commonwealth's decision to rely on the KPDES program requirements reflects the Commonwealth's intention that any future permits that it issues for new or increasing discharges into high quality or exceptional waters would allow such discharges only if they would not result in a significant lowering of water quality and that the Commonwealth may rely upon: (1) the comprehensive review of wastewater treatment and control alternatives conducted during EPA's development of effluent limitations guidelines for the CAFO point source category; (2) the additional requirements for implementation of BMPs in general and individual permits issued by the Commonwealth; (3) the implementation of a comprehensive nutrient management plan for these facilities to address discharges associated with land application of manure, litter or process wastewater by a CAFO; and (4) the conclusion that the short term and temporary lowering of water quality from any allowable discharge, i.e. discharge only after a 24-hour, 25-year storm event, would be insignificant. With respect to discharges from land application of CAFO wastes, EPA notes that when CAFOs land-apply wastes

in accordance with site-specific nutrient management practices that ensure appropriate agricultural utilization of the nutrients in that waste, any subsequent precipitation-related discharge is considered to be an "agricultural storm water discharge" that is, under the Act, exempt from regulation. See Waterkeeper Alliance, et al. v. U.S. Environmental Protection Agency, 399 F3d. 486, WL 453139, at *5 (Feb. 28, 2005 2nd Cir.).

EPA has allowed states to incorporate the concept of insignificant degradation into the high quality waters antidegradation decision process. (See 63 FR 36783). Where the lowering of water quality expected to occur does not rise to a level that is considered to be significant, the antidegradation review can be terminated. Kentucky has chosen to exercise this flexibility with respect to permits that it will issue for CAFO discharges to high quality waters and exceptional waters. The antidegradation implementation procedures that Kentucky has adopted do not require that an antidegradation review be conducted of discharges into Tier 2 waters under its CAFO general permits because the Commonwealth has determined that it will assure that such permits only allow discharges that will not cause a significant lowering of water quality.

Kentucky's current CAFO general permits include a provision that an antidegradation review will not be required for discharges covered by those permits. When Kentucky issued those permits in 2000, Kentucky only had a limited number of waters (Kentucky's exceptional waters) to which the antidegradation procedures applied. Kentucky's current CAFO general permits do not authorize discharges to exceptional waters; such discharges may be authorized by individual permits. Kentucky's adoption of its new category of high quality waters extends the antidegradation procedures to a large number of additional waters. Therefore, when Kentucky reissues its CAFO general permits and issues or reissues individual permits, Kentucky's new implementation procedures will assure that its permits will not allow discharges that would cause a significant lowering of water quality.

EPA finds this provision to be protective under these circumstances and hereby approves this provision. EPA commits to work closely with Kentucky as they develop their future CAFO general permits and issue new individual CAFO permits in light of these revised water quality provisions.

(E) 401 KAR 5:030 Section 1.(3)(b)1.e. [for high quality waters]:

1. Dischargers listed in clauses a through e of this subparagraph are subject to control by existing cabinet programs including the KPDES program. Subparagraphs 2 through 6 of this paragraph shall not apply to those dischargers identified in clauses a through e of this paragraph, except the cabinet shall assure water quality necessary to fully protect existing uses.

e. KPDES permit renewals and modifications that result in less than a twenty (20) percent increase in pollutant loading from the previously permitted pollutant loading

What information has Kentucky submitted in support of this provision?

In September, 2004, the Commonwealth submitted its new and revised water quality standards for review, including a provision to allow for no antidegradation review in cases where there was an increase in pollutant loading of less than 20% into high quality waters. The provision applies to existing KPDES dischargers that apply for an increase of less than 20% loading for a pollutant. If a discharger applies for an increased loading of 20% or more for any pollutant, the provision does not apply.

The Commonwealth submitted the new procedures for high quality waters on September 23, 2004. Kentucky also adopted a Statement of Consideration on December 4, 2003, referencing this provision, among others. EPA and Kentucky had discussions regarding this provision after Kentucky's submission. During these discussions, EPA indicated that a more appropriate way to determine whether a discharge could have an insignificant effect on water quality would be consideration of the assimilative capacity of the receiving water.

On April 11, 2005, LaJuana S. Wilcher, Secretary, Kentucky Environmental and Public Protection Cabinet, submitted to EPA, a letter with additional information and clarification on how Kentucky intends to interpret and implement the 20% provision. In the April 11, 2005, letter, the Commonwealth states that "if the Commonwealth has reason to believe that an increased discharge authorized by a permit renewal or modification (otherwise subject to clause (e)) will consume ten percent (10%) or more of the available remaining assimilative capacity of the receiving water, the Commonwealth will interpret 401 KAR 5:030, Section 1(3)(b)1. and clause (e) as requiring an antidegradation review to determine whether to authorize the lowering of water quality and, if so, to 'fully' protect the use of the receiving water pursuant to 401 KAR 5:029."

Also, in the April 11, 2005, letter, the Commonwealth stated, "Our review of available data has not indicated that any discharger in Kentucky that has increased its loading by less than twenty percent (20%) in a permit modification or renewal has consumed more than ten percent (10%) of the available remaining assimilative capacity of the receiving water."

What is EPA's conclusion on whether 401 KAR 5:030 Section 1(3)(b)1.e. [for high quality waters] complies with the requirements of 40 CFR § 131.12?

EPA is concluding that this provision is consistent with 40 CFR § 131.12(a)(2). EPA's analysis of the 20% loading provision under a variety of potential discharge scenarios, indicates that the increase in concentration of a pollutant in the receiving water resulting from this provision will be small, and that, in the vast majority of potential discharge scenarios, an expansion of less than 20% would result in a loss of less than 10% of the available assimilative capacity. (Available assimilative capacity is the difference between the water quality criterion for a pollutant and the ambient water quality level for that pollutant.)

EPA's analysis shows that it is possible that, in limited situations, a 20% expansion could use more than 10% of the available assimilative capacity of the receiving water, or could leave little assimilative capacity after the expansion. However, Kentucky stated in its April 11, 2005, letter that if such situations arise, the Commonwealth would require an antidegradation review. In light of EPA's analyses and Kentucky's assurances, EPA is approving this provision.

What is the background for EPA's conclusion that 401 KAR 5:030 Section 1.(3)(b)1.e. [for high quality waters] complies with the requirements of 40 CFR § 131.12?

To better understand the effect of this provision on high quality waters, EPA analyzed the potential effect of a 20% increase in loading on the water quality in the receiving stream using several flow and concentration scenarios of the upstream water and the effluent. Although Kentucky's standards address expansions of existing discharges "that result in *less than* a twenty (20) percent increase in pollutant loading from the previously permitted pollutant loading" (emphasis added), EPA used a 20% value as a way to estimate the potential increase in pollutant loading allowed by this provision. Therefore, the maximum lowering of water quality resulting from the application of this provision would be slightly less than that projected to occur at the 20% level for an expanded discharge, and expansions of less than 20% would have a commensurably smaller effect on water quality.

EPA's methods of analysis are contained in Appendix A, *Comparison of Allowable Effluent Levels Based on Application of Toxicity Provisions Related to Chronic and Acute Criteria*, and Appendix B, *Technical Support Document: Analysis of the 20% Provision*. A summary of the results of this analysis follows below. In this summary, the term "available assimilative capacity" refers to the difference between the water quality criterion (i.e., the water quality standard) for a pollutant, and the ambient water quality concentration for that pollutant before the discharge is expanded. The term "total assimilative capacity" refers to the assimilative capacity of the receiving stream for a pollutant, prior to allocation of any of this assimilative capacity to any source of the pollutant.

These modeling results show that, in most cases, a 20% increase in pollutant loading results in a small increase in pollutant concentrations in a receiving water. However, there are a few cases where a 20% increase in pollutant loading could result in using a substantial amount or all of the available assimilative capacity of the receiving stream. This is projected to occur only in cases where the "pre-expansion" effluent concentration is relatively high (i.e., equals or exceeds the chronic criterion value), and the current receiving water pollutant concentration is also relatively high. In other words, in scenarios where little assimilative capacity exists in the stream before the expansion, there is a possibility that almost no assimilative capacity could remain after the expansion.

In addition to evaluating the possible effect of the 20% provision on ambient water quality, EPA also analyzed how often increases of pollutant loading up to 20%

might occur. EPA reviewed historical KPDES permits for discharges to all waters to evaluate how often facilities in the Commonwealth have been permitted for expansions, in order to estimate the number of expansions that might be subjected to the 20% provision in the future. Based on information in the Permit Compliance System (PCS), EPA analyzed data for KPDES permits classified as major discharges. EPA compiled data for permits with effluent limitations for biochemical oxygen demand (BOD), expressed as a loading in pounds per day, for all major permits, i.e., major discharges classified as either "domestic" or "industrial." BOD was selected for this purpose as the parameter that was expected to appear in the most permits with a numeric effluent limitation, and, therefore, the best parameter to project whether discharges have "expanded," based on comparison of an effluent limit in an expiring permit issued by Kentucky to an effluent limit in a reissued permit.

Since January 1, 2000, KDOW has reissued 104 major permits, out of a total of 137 major discharges in the Commonwealth. Seventy of the 104 KPDES permits reissued over this five year period had adequate data for this review. Twelve (12) of the 70 permit reissuances reflected an increased effluent limitation for BOD loading. These increases ranged from 1.2 % to 100% of the previous BOD effluent limitation. Only 2 of these 12 expansions had an increased loading of less than 20%, i.e., expansions of 1.2% and 4.1% over previous permitted loadings for BOD. This analysis indicates that this provision would have very limited application for the future should historical permitting practices continue.

EPA engaged in further discussions with the Commonwealth in light of the possibility (even though expected to occur in only rare instances) of an expansion otherwise subject to Kentucky's 20% provision consuming a significant amount of the remaining assimilative capacity of a water. EPA raised this issue because EPA itself previously used a value of 10% or less of available assimilative capacity as "insignificant degradation" in the Water Quality Initiative for the Great Lakes (Water Quality Guidance for the Great Lakes System: Supplementary Information Document (GLI SID), EPA-820-B-95-001, March 1995, p. 207.) As a result of EPA's discussions with Kentucky, Kentucky has clarified that the Commonwealth will conduct an antidegradation review where the Commonwealth determines that an expanded discharge (otherwise subject to clause (e)) could result in consuming ten percent (10%) or more of the remaining available assimilative capacity. In the April 11, 2005, letter, Kentucky stated the following:

According to EPA, there are number of alternatives that a state could use to define a level of insignificant or *de minimis* degradation. The alternatives include establishing a criterion or operational definition of "insignificant degradation" based on a certain percent of remaining loading capacity, among other things. For example, EPA suggests that the lowering of water quality by a pollutant may be considered *de minimis* if it satisfies all of the following criteria: (1) the lowering of water quality uses less than ten percent (10%) of the available remaining assimilative capacity; and (2) at least ten percent (10%) of the total assimilative capacity remains unused.

Our review of available data has not indicated that any discharger in Kentucky that has increased its loading by less than twenty percent (20%) in a permit modification or renewal has consumed more than ten percent (10%) of the total assimilative capacity of the receiving water. Accordingly, this issue is likely to be more hypothetical than real. Nonetheless, if the Commonwealth has reason to believe that a discharge authorized by a permit renewal or modification (otherwise subject to clause (e)) will consume ten percent (10%) or more of the available remaining assimilative capacity of the receiving water, the Commonwealth will interpret 401 KAR 5:030, Section 1(3)(b)1. and clause (e) as requiring an anti-degradation review to determine whether to authorize the lowering of water quality and, if so, to "fully" protect the use of the receiving water pursuant to 401 KAR 5:029. The Commonwealth interprets the similar provisions of Section 1(2)(b)1. and clause (e), with regard to exceptional waters, in the same fashion.

Based on EPA's consideration of all of the above information, EPA is approving this new provision.

(F) 401 KAR 5:030 Section 1.(3)(b)2. [for high quality waters]:

Except as provided in subparagraph 5 of this paragraph, a KPDES permit for a new domestic sewage discharger or expanded domestic sewage discharge into high quality water shall contain effluent limitations for the entire effluent and shall have an effluent quality of:

- a. No greater than ten (10) mg/l five (5) day carbonaceous biochemical oxygen demand;**
- b. No greater than two (2) mg/l ammonia-nitrogen;**
- c. No greater than 0.010 mg/l total residual chlorine;**
- d. No greater than ten (10) mg/l total suspended solids;**
- e. No greater than one (1) mg/l total phosphorous;**
- f. A minimum of seven (7) mg/l dissolved oxygen; and**
- g. An arithmetic mean value for fecal coliform bacteria not to exceed 200 colonies per 100 milliliters during a period of thirty (30) consecutive days, or 400 colonies per 100 milliliters during a period of seven (7) consecutive days, or an arithmetic mean for Escherichia coli bacteria not to exceed 130 colonies per 100 milliliters during a period of thirty (30) consecutive days or 230 colonies per 100 milliliters during a period of seven consecutive days.**

What information has Kentucky submitted in support of 401 KAR 5:030 Section 1.(3)(b)2.(a), (b) (d) and (f)? (subparagraphs (c), (e), and (g) are discussed later)

The "default" limits listed in 401 KAR 5:030, Section 1.(3)(b)2. for domestic dischargers into high quality waters were adopted by the Commonwealth for application

to exceptional waters in 1995. In a letter dated November 13, 1995, EPA asked KDOW to clarify certain aspects of the Commonwealth's implementation of these limits for exceptional waters. In a December 8, 1995 letter from Phillip J. Shepard, Secretary, Kentucky Natural Resources and Environmental Protection Cabinet, to John H. Hankinson, Regional Administrator, EPA Region 4 Office, the Commonwealth stated:

If the assimilative capacity is sufficient, then **the most stringent limits that we impose** will be required. These are basically tertiary limits for domestic wastes for CBOD, ammonia, D.O. and technically achievable limits for . . . TSS. They are end-of-pipe limits and are to be met regardless of available dilution. [emphasis added]

In the December 8, 1995 letter, the Commonwealth responded to a question by EPA regarding the degree of lowering of water quality that would result from the implementation of 10 mg/l five day carbonaceous biochemical oxygen demand, 2 mg/l ammonia-nitrogen, and 7 mg/l dissolved oxygen (10-2-7) effluent limits on the category of exceptional waters. (At that time, Kentucky's position was that the exceptional water category was intended to include all waters of the Commonwealth with quality that "exceed levels necessary to support propagation of fish, shellfish, and wildlife, and recreation in and on the water.") EPA asked whether the Commonwealth had determined that the lowering of water quality that would result from these effluent limits was "insignificant." The Commonwealth provided the following response:

Significant degradation is assumed to not occur if the limits . . . are met. . . . These are the limits we commonly give for streams with zero 7Q10 flows. [i.e., the seven day average low flow value with a recurrence interval of ten years] This applies to all streams, so those with a positive 7Q10 would not get any dilution credit for these parameters. This results in more stringent limits and is considered to not lower water quality. This is a policy decision on the issue of insignificant degradation.

Further discussions were held between the two agencies, and in a letter dated October 9, 1997 from James E. Bickford, Secretary, Kentucky Natural Resources and Environmental Protection Cabinet, to John H. Hankinson, Jr., Regional Administrator, EPA Region 4 Office, the Commonwealth stated the following:

Subsection 1(5)(a)(1) [i.e., the section adopted in 1995 pertaining to exceptional waters] could be interpreted to give specific permit limits for domestic wastewater discharges. However, the wording states that the permit limits shall be "no greater than" those concentrations (BOD5, NH3-N, TRC, TSS, TP). In other words, the limits for the constituents in that subsection are the least stringent that would be given by the cabinet. If those limits are deemed not to be protective of the high quality water, more strict limits will be assigned or the permit could be denied altogether. Region 4 should be well aware of the many instances in which we have denied discharges even in use protected waters because a use was already or potentially impaired. We will not hesitate to take measures necessary to

protect high quality waters. . . The practical implication of categorizing a water as a high quality water is that the cabinet will always seek to steer dischargers away from these waters, and dischargers will largely want to avoid them either because of more stringent permit limits or the demonstrations that must be performed to be allowed to discharge under less stringent limits.

Also, in a July 27, 1998 letter from Jack A. Wilson, Director, KDOW, to Fritz Wagener, Chief, Water Quality Standard Section, EPA Region 4 Office, the Commonwealth stated:

. . . the KDOW seeks to clarify language in Kentucky Water Quality Standards Regulation 401 KAR (5)(a)(1) regarding effluent limits for new and expanded sanitary discharges into high quality waters. The regulation sets minimum limits but does not indicate when more stringent limits will be applied or the manner in which limits will be derived.

Unless a demonstration is made of the socio-economic necessity of the facility . . ., no new *privately*-owned sanitary wastewater treatment plant will be allowed in a high quality water. . .

Expansion of existing privately owned sanitary wastewater treatment plants in high quality waters will be allowed provided effluent limits are reduced to a level that does not increase pollutant loading or maintains existing water quality (as demonstrated by modeling). Phosphorus removal also will be required for expanded private facilities. It should be emphasized that the operational history of facilities requesting an expansion is closely scrutinized. Facilities in non-compliance are not allowed expansions unless problems with overloading or outdated facilities are resolved by the expansion.

For new and expanded publicly owned sanitary wastewater treatment plants, the limits in the regulation for CBOD5 (10 mg/l) and ammonia nitrogen (2/5 mg/l summer/winter) will apply if the WLA model predicts that DO does not fall below 6 mg/l during 7Q10 low flow conditions. This provides added protection for high quality water [i.e., the category of exceptional waters at that time] compared to use protected waters (other than waters classified as Coldwater Aquatic Habitat), where DO must remain at least 5 mg/l.

In a letter dated October 14, 1998 from Robert F. McGhee, Director, Water Management Division, EPA Region 4 Office, to James E. Bickford, Secretary, Kentucky Natural Resources and Environmental Protection Cabinet, EPA approved this provision (for application to exceptional waters), stating:

Based on review of these clarifications of the Commonwealth's implementation of the antidegradation policy for sanitary wastewater treatment plants, EPA is now approving subsection 1(5)(a)(1) and Section 1(5)(b) of KAR 5:030 pursuant to Section 303(c) of the Clean Water Act. The above clarifications are sufficient

to demonstrate that, unless the Tier 2 process is completed and the Commonwealth makes the requisite findings: (1) with respect to new privately-owned sanitary waste treatment systems, no lowering of water quality is allowed and, (2) with respect to new and expanded publicly-owned sanitary wastewater treatment plants, no significant lowering will be allowed. For expansions of privately-owned sanitary wastewater treatment plants, no lowering of water quality is allowed. These requirements are consistent with the federal antidegradation policy at 40 CFR Section 131.12(a) and EPA's interpretation of the policy.

In more recent correspondence (dated February 25, 2005) related to Kentucky's latest submission, LaJuana S. Wilcher, Secretary, Kentucky Environmental and Public Protection Cabinet, provided additional data on the implementation of this provision (as it has been applied to exceptional waters) and describes the rationale used to establish these effluent limits as regulatory requirements. The Commonwealth stated that there had only been two instances where more stringent limitations for BOD and ammonia had been required as KPDES permit limits, as these limits are the "generally accepted minimum limits due to technological feasibility." The Commonwealth also stated that the text of the regulation, which requires that the concentrations for these parameters must be "no greater than" those listed, provides additional authority that the Cabinet can use to establish more stringent limitations, "in the event that it believes that a discharge could be allowed but more stringent limitations were necessary to protect the special status of the water." This authority has been used by the Cabinet in the past, as five applications for discharge directly to, or to waters upstream of, exceptional waters have been denied a permit to discharge to those waters based on the application of the previously adopted provision that applied to exceptional waters in the Commonwealth.

Kentucky also provided information on two instances of implementation of these limitations for dischargers applying for expanded discharge to exceptional waters: Booneville (South Fork Kentucky River) and Columbia (Russell Creek). In both cases, the applicant accepted the 10/2/7 limitations for the expanded discharge. The final KPDES permits for these facilities included the 10/2/7 limitations, in lieu of the less stringent limitations of 20 mg/l CBOD and 4 mg/l ammonia for Booneville, and 15 mg/l CBOD and 2 mg/l ammonia for Columbia, which would have been required without application of this antidegradation provision. Also, the Commonwealth required "Grade 1 Reliability" for these facilities, which requires backup power and other facility controls that would not have been implemented without application of this antidegradation provision.

Kentucky provided an analysis of privately-owned domestic facilities to demonstrate the reduction of CBOD and ammonia that might be expected after this provision became an effective water quality standard. Kentucky provided data for the following facilities to show "the reductions in pollutant loading if they [had chosen] the more stringent limits as compared to the usual limits derived from the wasteload allocation from the water quality-based permitting approach normally applied":

<u>Facility</u>	<u>Existing</u>		<u>High Quality Waters</u>	
	<u>Limits (mg/l)</u>	<u>Loading (#/d)</u>	<u>Limits (mg/l)</u>	<u>Loading (#/d)</u>
Russell Subdivision	30-4-7	15 CBOD 2 Ammonia	10-2-7	5 CBOD 1 Ammonia
Dorton Recreation Park	30-4-7	0.38 CBOD 0.05 Ammonia	10-2-7	0.13 CBOD 0.025 Amm.
Community Christian Academy	30-4-7	5 CBOD 0.67 Ammonia	10-2-7	1.67 CBOD 0.33 Ammonia
Cedar Point	30-20-2	1.25 CBOD 0.83 Ammonia	10-2-7	0.42 CBOD 0.83 Ammonia
Community Center	30-4-7	1.75 CBOD 0.23 Ammonia	10-2-7	0.58 CBOD 0.12 Ammonia

Based on the information submitted in the February 25, 2005 letter, application of the High Quality Water-based effluent limits would result in a reduction of CBOD from 23.38 pounds per day to 7.8 pounds per day, which would represent a 67% reduction in total amount of CBOD in discharges from these existing facilities. For ammonia, application of the High Quality Water-based effluent limits would result in a reduction from 3.78 pounds per day to 2.3 pounds per day, which would represent a 39% reduction in the total amount of ammonia in discharges from these facilities.

What is EPA's conclusion on whether 401 KAR 5:030 Section 1.(3)(b)2.(a), (b), (d) and (f) comply with the requirements of 40 CFR § 131.12?

The federal antidegradation policy does not require the assignment of "default" effluent limits for discharges that are subject to the high quality water decision process. However, this option can be useful in the implementation of antidegradation requirements, in cases where a state's goal is to minimize the water quality effects of the discharge. Therefore, the effluent limitations listed in 401 KAR 5:030, Section 1.(3)(b)2.a., b., d., and f. represent appropriate "default" limits for protection of high quality waters in the Commonwealth, and are consistent with the provisions of 40 CFR § 131.12(a)(2). These "default" limits are the most stringent levels of treatment that the Commonwealth has generally required for domestic discharges. Kentucky has represented that these default limits will prevent any lowering of ambient dissolved oxygen levels due to expansions of privately-owned domestic discharges, and that the limits will not result in the significant lowering of ambient dissolved oxygen levels due to new or expanded publicly-owned domestic discharges. In those rare instances where these default limits are not protective of water quality, KDOW has required more stringent options for permit applicants in the form of more stringent limits or a prohibition on discharge. The effect of this provision and its implementation by KDOW is to prevent any significant lowering of water quality. EPA approves this provision.

What is the background for EPA's conclusion that 401 KAR 5:030 Section 1.(3)(b)2.(a), (b), (d), and (f) comply with the requirements of 40 CFR § 131.12?

EPA's minimum treatment technology requirements for domestic discharges at 40 CFR 133.102(a)(1), i.e., "secondary treatment," include a 30-day average concentration limit of 30 mg/l for biochemical oxygen demand. [Although the definition does not include provisions for ammonia, ammonia-nitrogen levels are usually in the range of 15 to 20 mg/l in wastewater that receives secondary treatment.]

An effluent limitation of 10 mg/l CBOD represents a 67% reduction of CBOD over secondary treatment requirements, and 2 mg/l ammonia represents an approximate 90% reduction of influent levels of ammonia in domestic wastewater. Kentucky has also submitted data to show that implementation of this provision could result in a substantial reduction of CBOD and ammonia discharged from private domestic facilities in the Commonwealth, should these facilities choose the more restrictive 10-2-7 default effluent limits. EPA agrees with KDOW's determination that the 10-2-7 limits for CBOD, ammonia-nitrogen, and dissolved oxygen, as well as the limit of 10 mg/l for total suspended solids, are in the range of the highest level of treatment technology that is feasible for domestic discharges located in the Commonwealth. Therefore, these limits minimize (to the extent available using current domestic wastewater treatment operations) the degree of lowering of water quality for these discharges.

The effluent limit of 7 mg/l for dissolved oxygen was compared with the level of saturation of dissolved oxygen at the "design" ambient temperature that KDOW uses to establish wasteload allocations for point source discharges. At the design temperature of 25 degrees C, a level of 7 mg/l represents 84 percent of saturation for dissolved oxygen. This level represents a stringent level for operation of treatment unit operations for domestic dischargers, as it approaches a level of 100 percent saturation. For any receiving stream with ambient dissolved oxygen levels that are less than 7 mg/l, the inclusion of this limit will serve to increase ambient dissolved oxygen levels at the point of discharge. Also, since the effluent requirement was established as a "minimum" concentration, average effluent dissolved oxygen levels, e.g., daily average values, must be at higher concentrations in order to reliably achieve compliance with this limit.

Kentucky has exercised the authority under the "no greater than" clause of this provision to require more stringent options for permit applicants, where information warranted these controls for protection of the aquatic resources of exceptional waters, and has represented to EPA that this practice would continue for high quality waters, as well. In a July 27, 1998 letter from Jack A. Wilson, Director, KDOW, to Fritz Wagener, Chief, Water Quality Standard Section, EPA Region 4 Office, the Commonwealth stated that this provision, when applied to exceptional waters, "does not increase pollutant loading or maintains existing water quality" for expansions of existing privately owned sanitary wastewater treatment plants, and will result in maintaining ambient dissolved oxygen levels at or above 6 mg/l during 7Q10 low flow conditions for new and expanded

publicly owned sanitary wastewater treatment plants. With this understanding, EPA is approving these provisions for application to high quality waters.

What information has Kentucky submitted in support of 401 KAR 5:030 Section 1.(3)(b)2.(c) (total residual chlorine) and (g) (fecal coliform bacteria)? (subparagraph (e) is discussed later)

The “default” limits listed in 401 KAR 5:030, Section 1.(3)(b)2. for domestic dischargers into high quality waters were adopted by the Commonwealth for application to exceptional waters in 1995. In a letter dated November 13, 1995, EPA asked KDOW to clarify certain aspects of the Commonwealth’s implementation of these limits for exceptional waters. In a December 8, 1995 letter from Phillip J. Shepard, Secretary, Kentucky Natural Resources and Environmental Protection Cabinet, to John H. Hankinson, Regional Administrator, EPA Region 4 Office, the Commonwealth stated:

If the assimilative capacity is sufficient, then **the most stringent limits that we impose** will be required. . . Fecal coliform limits are based on Kentucky treatment requirements and the TRC limit is the chronic criteria for warmwater aquatic habitat protection. They are end-of-pipe limits and are to be met regardless of available dilution. [emphasis added]

What is EPA’s conclusion on whether 401 KAR 5:030 Section 1.(3)(b)2.(c) and (g) comply with the requirements of 40 CFR § 131.12?

The combination of the provisions of 401 KAR 5:030, Section 1.(3)(b)2.c. and g. are sufficient to prevent significant water quality lowering for these parameters in high quality waters. These limits serve to eliminate or minimize (to the extent available using operational control of domestic wastewater treatment operations) the levels of bacteriological densities and total residual chlorine in discharges to high quality waters. The stringent levels of chlorine and fecal coliform bacteria result in target levels of zero for wastewater discharged from domestic facilities, and the “no greater than” clause of this provision provides additional authorities for KDOW to require more restrictive conditions for discharge of these parameters. An effluent target level of zero is an effective approach to avoid significant lowering of water quality due to the discharge of these parameters. Therefore, EPA concludes that the provisions of 401 KAR 5:030, Section 1.(3)(b)2.c. and g. are consistent with the provisions of 40 CFR § 131.12(a)(2).

What is the background for EPA’s conclusion that 401 KAR 5:030 Section 1.(3)(b)2.(c) and (g) comply with the requirements of 40 CFR § 131.12?

EPA considered the provisions of 401 KAR 5:030, Section 1.(3)(b)2.c. and g. together, since both provisions relate to disinfection requirements for domestic discharges, including the release of total residual chlorine from the disinfection process into high quality waters.

The limits specified in 401 KAR 5:030, Section 1.(3)(b)2.g. for domestic discharges for bacteriological densities, i.e., either fecal coliform or *Escherichia coli* bacteria (which is a subcategory of fecal coliform bacteria), address the water quality criteria for protection and maintenance of primary contact recreational uses. The values of these default effluent limits are based on the Commonwealth's water quality criteria values for these parameters. The Commonwealth intends that each effluent be completely disinfected, i.e., 100 percent disinfection, as measured by these surrogate bacteriological parameters. The implementation of this requirement will result in effluent density values of zero (or near zero), and, therefore, the effect of this provision should be to minimize any additional discharge of fecal coliform bacteria to the environment from domestic discharges that choose to accept the default effluent limits. The effect of this provision is to prevent the presence of coliforms in the discharges to which this provision applies and to prevent significant lowering of water quality for this parameter.

Kentucky also chose to include a default limitation for total residual chlorine of not to exceed 0.010 mg/l in domestic discharges to high quality waters since chlorine is a commonly-used disinfectant for wastewater treatment purposes. This value is close to the Commonwealth's water quality criteria for chlorine, 0.011 mg/l. However the level of operational control for effluent chlorine concentrations is very similar to that discussed above for effluent bacteriological densities. The inclusion of the effluent limit of 0.010 mg/l for domestic discharges to high quality waters serves to establish the effective level of effluent chlorine at zero. This can be achieved by either operation of unit treatment facilities to eliminate the presence of any chlorine from a discharge, or to encourage the use of alternate disinfection technologies that do not use chlorine. Therefore, the effect of this provision is the same as that for fecal coliform. The default limit for total residual chlorine should result in the minimization, or prevention, of the discharge of chlorine to the high quality waters and to prevent significant lowering of water quality for this parameter.

What information has Kentucky submitted in support of 401 KAR 5:030 Section 1.(3)(b)2.(e) (total phosphorus)?

A "default" limit of 1 mg/l for total phosphorus (TP) for new and expanded domestic dischargers was adopted by the Commonwealth for application to exceptional waters in 1995. In a letter dated November 13, 1995, EPA asked KDOW to clarify certain aspects of the Commonwealth's implementation of the TP limit for exceptional waters. In a December 8, 1995 letter from Phillip J. Shepard, Secretary, Kentucky Natural Resources and Environmental Protection Cabinet, to John H. Hankinson, Regional Administrator, EPA Region 4 Office, the Commonwealth stated:

If the assimilative capacity is sufficient, then **the most stringent limits that we impose** will be required. These are basically tertiary limits for domestic wastes for . . . TP. They are end-of-pipe limits and are to be met regardless of available dilution. [emphasis added]

What is EPA's conclusion on whether 401 KAR 5:030 Section 1.(3)(b)2.(e) complies with the requirements of 40 CFR § 131.12?

As is the case with BOD, this default limit for phosphorus is the most stringent level of treatment that the Commonwealth has generally required for domestic discharges. Moreover, as was noted in the discussion of subparagraphs 2.(a), (b), (d), and (f) of 401 KAR 5:030 Section 1.(3)(b), in those rare instances where these default limits are protective of a high quality water, KDOW will require more stringent options for permit applicants in the form of more stringent limits or a prohibition on discharge. The effect of this provision and its implementation by KDOW is to prevent any significant lowering of water quality. EPA approves this provision.

What is the background for EPA's conclusion that 401 KAR 5:030 Section 1.(3)(b)2.(e) complies with the requirements of 40 CFR § 131.12?

The provisions of 401 KAR 5:030, Section 1.(3)(b)2.e. limit the level of total phosphorus to 1 mg/l in domestic discharges to high quality waters, which represents an approximate 90% reduction of typical influent levels of total phosphorus in domestic wastewater. Therefore, in some cases involving the expansion of existing discharges, application of this default limit will actually result in the reduction of ambient levels of phosphorus in the receiving water bodies for these discharges, and no water quality degradation related to TP will occur.

G. 401 KAR 5:030 Section 1(3)(b)3. [for high quality waters]:

Except as provided in subparagraph 7 of this paragraph, a KPDES permit for a new non-domestic discharge or an expanded non-domestic discharge into high quality water shall be restricted to no more than one-half (½) of the water quality based limitations that would have been permitted at standard design conditions.

What information has Kentucky submitted in support of 401 KAR 5:030 Section 1(3)(b)3. [for high quality waters]?

On August 7, 1997, EPA approved an identical provision for exceptional waters that restricts effluent limits for new or expanded non-domestic discharges to ½ of water quality-based effluent limits established at standard design conditions. In the December 4, 2003 Statement of Consideration published by Kentucky in support of the adoption of the 2003 – 2004 triennial review revisions, KDOW responded to comments on the application of this provision to the proposed high quality waters category by stating, "With regard to the 50% of criteria issue, the requirement for restricting discharges to no more than 50% of the limit that would be permitted under standard design conditions was previously approved by EPA."

In a letter dated February 25, 2005, from LaJuana S. Wilcher, Secretary, Kentucky Environmental and Public Protection Cabinet, to Jim Giattina, Director, EPA

Region 4 Water Management Division, Kentucky described the rationale used in adopting this provision:

The cabinet believes that limits twice as stringent as already conservative water quality-based limits result in no significant lowering of water quality, and we therefore have determined that new and expanded non-domestic discharges that accept these limits require no further antidegradation analysis.

What is EPA's conclusion on whether 401 KAR 5:030 Section 1(3)(b)3. complies with the requirements of 40 CFR § 131.12?

EPA has concluded that this provision is consistent with 40 CFR § 131.12(a)(2). EPA conducted an analysis of the potential effect of this provision on ambient water quality. EPA has concluded that Kentucky's approach preserves a significant amount of the receiving water body's assimilative capacity in cases where background pollutant concentrations are low. Where background pollutant concentrations reach levels that approach the chronic water quality criterion, this approach preserves almost all the remaining assimilative capacity, or would lead to downstream water quality that is improved when compared to upstream background levels.

EPA understands that this provision was adopted by the Commonwealth to differentiate between activities that are likely to have an insignificant effect on water quality and those that are likely to have significant effects. EPA has accepted different State approaches to defining "significant degradation," and Kentucky's approach is similar to standards that have been approved by EPA elsewhere (e.g., in North Carolina).

What is the background for EPA's conclusion that 401 KAR 5:030 Section 1(3)(b)3. complies with the requirements of 40 CFR § 131.12?

EPA approved this provision for exceptional waters on August 7, 1997. This provision has not yet been applied in an exceptional water setting, and, therefore, quantifiable information on the effect of application of this provision is not available. To better understand the effect of the provision, EPA analyzed several aspects of the threshold using several upstream "background" instream flow and concentration scenarios. EPA reviewed how the water quality criteria in KAR 5:031 would likely be applied in the development of water quality-based effluent limitations and the predicted outcome of this provision based on the projections of instream flow variations at several flow gaging stations in the Commonwealth. EPA's methods of analysis are contained in Appendix A, *Comparison of Allowable Effluent Levels Based on Application of Toxicity Provisions Related to Chronic and Acute Criteria*, and Appendix C, *Technical Support Document: Analysis of the 1/2 Effluent Limits Provision*. A summary of the results of this analysis follows below.

EPA's analysis shows that application of this provision for new discharges will always preserve a significant amount of the available assimilative capacity. In some cases, this provision will prevent **any** lowering of water quality.

EPA also considered how this provision would apply to expansions of existing discharges with water quality based limitations. Application of this provision to an existing discharge would lead to improved water quality downstream of an existing discharge for all expansions proposed at less than two times the existing loading of a pollutant, i.e., prior to the application of the provision.

To further analyze the effect this provision could have on Kentucky waters, EPA also reviewed historical KPDES permits for discharges to all Kentucky waters to evaluate how often facilities in the Commonwealth have been permitted for expansions. We did this to estimate the number of expansions that might occur in the future. Based on information in the Permit Compliance System (PCS), we analyzed data for KPDES permits classified as major discharges, including both domestic and industrial dischargers. We compiled data for all major permits with effluent limits for biochemical oxygen demand (BOD), expressed as a loading in pounds per day. We selected BOD as an indicator parameter, one that was expected to appear in the most permits as a numeric effluent limitation. This made BOD the best parameter to evaluate whether discharges have "expanded" based on comparison of an effluent limit in an expiring permit to an effluent limit in a reissued permit.

EPA analyzed PCS data for major dischargers in the Commonwealth from January 1, 2000 to January 1, 2005. During that five-year period, KDOW reissued 104 major permits, out of a total of 137 major permits in the Commonwealth. Seventy (70) of the 104 KPDES permits reissued over this five year period had adequate data for this review. Twelve (12) of the 70 permit reissuances reflected an increased effluent limitation for BOD loading. These increases ranged from 1.2 % to 100% of the previous BOD effluent limitation.

Based on this analysis of major discharger expansions in Kentucky over the past five years, no dischargers have expanded by more than 100% in the past five years. If that situation continues, this provision would not result in any lowering of water quality from expanded discharges, and would lead to improved water quality over that allowed under current permitted loadings in a significant number of cases.

In summary, Kentucky's approach preserves a significant amount of the receiving water body's assimilative capacity in cases where background pollutant concentrations are low. Where background pollutant concentrations reach levels that approach the chronic water quality criterion, this approach preserves almost all the remaining assimilative capacity, or would lead to downstream water quality that is improved when compared to upstream background levels. For existing discharges where current limitations are based on water quality considerations, application of this provision will avoid lowering water quality in many, if not all, cases based on historical permitting practices in the Commonwealth. As a result, EPA finds this provision to be consistent with the requirements of 40 CFR § 131.12.

EPA has allowed states to incorporate the concept of insignificant degradation into the high quality waters antidegradation decision process. (See 63 FR 36783). Where the lowering of water quality expected to occur does not rise to a level that is considered to be significant, the antidegradation review can be terminated. EPA understands that this provision was adopted by the Commonwealth to differentiate between activities that are likely to have an insignificant effect on water quality and those that are likely to have significant effects. EPA has accepted a range of State approaches to defining "significant degradation" and Kentucky's approach is similar to what has been accepted elsewhere (e.g., in North Carolina). Based on the above analysis, EPA approves 401 KAR 5:030 Section 1(3)(b)3.

(H) 401 KAR 5:030 Section 1.(2)(b)7. [for exceptional waters] and Section 1.(3)(b)5. [for high quality waters]:

For purposes of this administrative regulation, the approval of a POTW's regional facility plan pursuant to 401 KAR 5:006 shall demonstrate compliance with the alternatives analysis and socioeconomic demonstration for a regional facility.

What information has Kentucky submitted in support of 401 KAR 5:030 Section 1.(2)(b)7. [for exceptional waters] and Section 1.(3)(b)5. [for high quality waters]?

Regulation 401 KAR 5:006, entitled "Wastewater planning requirements for regional areas," establishes the process for regional planning agencies and the Commonwealth to comply with certain provisions of CWA sections 201, 205, 208, and 303(e). The requirements of 401 KAR 5:006 address the planning for control of point sources within CWA section 208 planning areas, including the development of a wastewater treatment management plan applicable to all wastewaters generated in these planning areas.

This regulation requires the preparation of a facility plan prior to the construction of a new publicly owned treatment works (POTW) or the expansion of an existing POTW, including the following activities: (1) a new regional facility is proposed to be constructed within the planning area; (2) the average daily design capacity of an existing regional facility is proposed to be expanded by more than thirty percent; or (3) the equivalent population served by an existing regional sewage collection system is proposed to be expanded by more than thirty percent of the existing population served. Regarding the second factor, EPA understands that the applicable provisions of the high quality antidegradation procedures apply to any POTW proposing to expand by less than thirty percent. These include the default limitations specified in 401 KAR Section 1.(3)(b)(2) and the alternative analysis and socioeconomic demonstration requirements in 401 KAR Section 1.(3)(b)(5).

KAR 5:006 specifies that a facility plan must include "the necessary information to allow for an environmental assessment and to assure that the most cost-effective and environmentally sound means of achieving the established water quality goals can be

implemented.” The regulation requires that a facility plan include the following information:

- A description and evaluation of existing regional facilities;
- The identification of any other sewage treatment plants located in, or serving a part of, the planning area;
- A description of the planning area characteristics, including an evaluation of soils characteristics and topography for on-site sewage disposal systems;
- A discussion of the need for a proposed project including the historical compliance status of the current facility, applicable permit limits, and, if proposed sewers are involved, documentation as to why on-site systems are not acceptable;
- A discussion of any water quality or public health problems in the area;
- A description of any type of state or federal enforcement actions that may exist against any wastewater treatment plant within the area; a discussion of the current and projected population in the planning area, including existing population in the current service area, a projection of the twenty year population in the current service area, the existing population in unsewered parts of the planning area, and a projection of the twenty year population in the unsewered parts of the planning area;
- A listing of current and projected industrial and commercial users of the system; a local planning and zoning land use map if available;
- A detailed evaluation of alternatives that reflect a comprehensive regional plan for the planning area, taking into account the minimization of the number of point source discharges, and a twenty year present worth cost analysis for each alternative;
- An evaluation of all wastewater management alternatives considered, including no action;
- The basis for the engineering judgment for selection of the alternatives chosen for detailed evaluation;
- A discussion of nonmonetary effectiveness criteria, including implementability, environmental impact, engineering evaluation, public support, and regionalization;
- Intended sources of funding; and
- Estimated user fees.

In addition to the cost for the proposed project, the facility plan includes cost estimates over the range of the entire twenty year planning period for the following categories of construction: secondary wastewater treatment, advanced wastewater treatment, inflow and infiltration correction, major sewer rehabilitation, new collector sewers, interceptor sewers, combined sewer overflow corrections, and storm water pollution corrections.

KAR 5:006 also requires that a public participation process be conducted on the facility plan. The public has an opportunity to comment on the draft plan during a comment period of at least thirty days, and a public hearing on the draft plan is required. At the public hearing, the scope of the project, the cost of the project, the alternatives

considered, and the estimated user charges and hook-up fees are discussed. Any person may submit written or oral statements and data to the regional planning agency concerning the draft regional facility plan. The regulation specifically request that commenters "who believe any condition of the draft plan is inappropriate, inaccurate, incomplete, or otherwise not in the best interest of the public and the environment, shall raise all reasonably ascertainable issues and submit all reasonably available arguments and factual background supporting their position . . ." The final facility plan must include documentation of any public meetings, public hearings, and the public notices calling for public review of the project.

KAR 5:006 requires that the Cabinet prepare an environmental assessment report which summarizes the regional facility plan, and that the assessment report be submitted to the State Clearinghouse for review and comments. Mitigative measures may be required to address any negative comments as a result of this review. If the Cabinet finds that the regional facility plan has been properly submitted and is in the best interest of the environment and the public, the Cabinet will approve the plan.

The Cabinet's approval of a regional facility plan under 401 KAR 5:006 is the final step in the facility planning process. A decision by the Cabinet to approve a facility plan can be appealed within a thirty day period of notice of the Cabinet's determination. If an appeal is made, a hearing is held before the Cabinet on the appeal.

In the December 4, 2003 Statement of Consideration relating to the Commonwealth's adoption of revisions based on the 2003 - 2004 triennial review of water quality standards, the Commonwealth stated that the Cabinet's approval "will demonstrate compliance with the alternatives analysis and socioeconomic demonstration" for the antidegradation decision process for exceptional waters and high quality waters. In responding to public comment on the proposed inclusion of this provision, the Commonwealth stated, "Regional Facility Plans address alternatives to discharge location, treatment technology, area served, and analysis of economic costs, and they involve significant public review and comment."

In a letter dated August 10, 2004, from LaJuana S. Wilcher, Secretary of the Kentucky Environmental and Public Protection Cabinet to Jim Giattina, Director of EPA Region 4 Water Management Division, the Commonwealth provided portions of the Facility Plan for Sanitation District Number 1 of Boone, Campbell, and Keaton Counties for consideration during EPA's review of this provision. A discussion of relevant portions of this plan is included below.

The portions of the plan submitted to EPA include engineering and cost effectiveness evaluations for preliminary and secondary wastewater treatment alternatives, advanced secondary treatment alternatives, disinfection alternatives, and sludge treatment and disposal alternatives for the proposed project, including the alternative of advanced secondary treatment. Chapter Eight of the plan contains an evaluation of alternate treatment schemes for the project, which combine various treatment alternatives listed above. These treatment schemes were evaluated for the

following criteria: cost effectiveness, physical resources impact, odor production, natural resources impact, contribution to the areas goals, cultural resources impact, reliability, engineering evaluation, land use, energy consumption, expandability, chemical use, and implementation capability. Phasing of construction was also considered.

The proposal evaluated and recommended the closure of two existing POTWs and the possible elimination of 31 private package treatment plants. The planning process involved a stakeholder process for treatment site selection, including the evaluation of criteria for physical/engineering, economic, social and environmental aspects of approximately 20 sites. Revisions to the proposed alternative were made based on comments made by the U.S. Fish and Wildlife Service, the Kentucky State Nature Preserves Commission, the Kentucky Division of Air Quality, and the Kentucky Heritage Council.

Also, in a letter dated February 25, 2005, from LaJuana S. Wilcher, Secretary, Kentucky Environmental and Public Protection Cabinet, to Jim Giattina, Director, EPA Region 4 Water Management Division, Kentucky further described the rationale used in adopting this provision:

As stated in 401 KAR 5:006, the purpose of the regional facility planning process is to develop a comprehensive plan for the management of water resources and to provide for the prevention, abatement, and control of all water pollution. The socio-economic benefit of regional wastewater treatment facilities are intuitive and tangible. Regional sewer systems served by state of the art treatment facilities allow for economic development for both industrial and domestic interests. Regional facility plans determine how to best serve anticipated growth and growth that has already occurred in areas that don't have sufficient infrastructure (i.e. elimination of straight pipes, on-site wastewater systems, and package treatment plants). Planning and developing wastewater infrastructure results in increased property values and tax base for the community.

What is EPA's conclusion on whether 401 KAR 5:030 Section 1.(2)(b)7. [for exceptional waters] and Section 1.(3)(b)5. [for high quality waters] comply with the requirements of 40 CFR § 131.12?

EPA concludes that this provision for review of new and expanded POTWs is consistent with 40 CFR § 131.12(a)(2). The provision establishes a process for evaluation of alternatives and social and economic considerations that is equivalent to the antidegradation review required under 40 CFR § 131.12(a)(2). EPA approves this provision.

What is the background for EPA's conclusion that 401 KAR 5:030 Section 1.(2)(b)7. [for exceptional waters] and Section 1.(3)(b)5. [for high quality waters] comply with the requirements of 40 CFR § 131.12?

The Commonwealth's regulatory provisions require consideration of the need for

collection and treatment of sewage in the planning area, an evaluation of treatment and discharge alternatives (including the minimization of point sources in the planning area), the documentation of public health problems that would be addressed by the project, consideration of local planning and land use zoning, an evaluation of the social and environmental aspects of alternatives, detailed evaluations of the cost-effectiveness of treatment and disposal alternatives, and a public review process that provides the public and other state and federal agencies an opportunity to affect changes in the proposed plan. The Kentucky Environmental and Public Protection Cabinet is responsible for a final decision regarding plan approval, including whether the plan "is in the best interest of the environment and the public." These components for development of a Facility Plan combine to establish a decision process that is equivalent to the antidegradation review required under 40 CFR § 131.12(a)(2).

PART - 5 DISCUSSION OF EPA'S REVIEW OF OTHER NEW AND REVISED PROVISIONS IN KENTUCKY'S ANTIDEGRADATION IMPLEMENTATION METHODOLOGY

401 KAR 5:030 Section 1:

In the introductory discussion of "Categorization and Implementation" in Section 1, a sentence was added that acknowledges that a flow chart was included in Section 3.

What is EPA's conclusion on whether this provision complies with the requirements of 40 CFR § 131.12?

The flow chart outlines the procedures for categorization and implementation of the Commonwealth's antidegradation policy [401 KAR 5:029, Section 1] for point source discharges, and is considered by EPA to be for clarification purposes only.

401 KAR 5:030 Section 1.(1)(b):

The implementation procedure for ONRWs in KAR 5:030 Section 1.(1)(b) was modified to include the following statement: "A new discharger or expanded discharge which may result in permanent or long-term changes in water quality is prohibited."

What is EPA's conclusion on whether this provision complies with the requirements of 40 CFR § 131.12?

This is consistent with the requirements for ONRWs in 40 CFR § 131.12(a)(3), and EPA's previous interpretations of this regulation. (See 61 FR 64816 and 63 FR 36786) EPA approves this provision.

401 KAR 5:030 Section 1.(2)(a)2:

The categorization criteria for exceptional waters in subparagraph (2)(a)2. of Section 1 were clarified. References to the provisions of KAR 5:031, Section 8.(1)(a)1, 2

and 3, and Section 8(1)(b) were added to clarify the previously adopted categorization criteria in relation to OSRWs.

What is EPA's conclusion on whether this provision complies with the requirements of 40 CFR § 131.12?

This revision is considered by EPA to be for clarification purposes only.

401 KAR 5:030 Section 1.(2)(b)(6):

Subparagraph (b)6. was revised to include the following: "If the permit applicant *accepts the effluent limitations* required by subparagraphs 3, 4 and 5 of this paragraph, the KPDES permit shall be issued with these effluent limitation and additional requirements of the KPDES program without further review." The previously adopted provision stated: "If the permit applicant *determines that it can meet effluent limitations* required by ..."

What is EPA's conclusion on whether 401 KAR 5:030 Section 1.(2)(b)(6) complies with the requirements of 40 CFR § 131.12?

This revision clarifies that a permit applicant can *accept* the effluent limitations, which completes the Commonwealth's antidegradation review process. (See discussion of the provision for inclusion of these effluent limitations in other parts of this memorandum.) If the applicant does not *accept* the effluent limitations, further review is conducted under the provisions of Subparagraph (b)7. of Section 1. EPA approves this provision.

401 KAR 5:030 Section 1.(2)(b)(7):

Subparagraph (b)7. of Section 1 was revised to include provisions similar to those adopted in Subparagraph (b)6, as well as the addition of a specific requirement for analysis of alternatives: "If the permit applicant *does not accept the effluent limitations* required by subparagraphs 3, 4 and 5 of this paragraph, the applicant shall demonstrate to the satisfaction of the cabinet that *no technologically or economically feasible alternatives exist and that* allowing lower water quality is necessary to accommodate important economic or social development in the area in which the water is located." This revision replaces the previously adopted provision: "If a permit applicant *cannot meet the effluent limitations* the applicant may request a less stringent limitation. In making this request, the applicant shall demonstrate to the satisfaction of the cabinet that allowing lower water quality is necessary to accommodate important economic or social development in the area in which the water is located ..."

What is EPA's conclusion on whether 401 KAR 5:030 Section 1.(2)(b)(7) complies with the requirements of 40 CFR § 131.12?

These revisions are consistent with the provisions of 40 CFR § 131.12(a)(2). The procedure now requires an applicant (1) to show that alternatives (i.e., options that would result in a lesser degree of lowering) are not technologically or economically feasible, and (2) to demonstrate that the activity is related to important economic or social development, if the applicant does not *accept* the effluent limitations required in other parts of this paragraph. EPA approves these revisions.

401 KAR 5:030 Section 1.(2)(b)(7)(f):

Subparagraph (b)7 of Section 1 also specifies a list of alternatives that must be considered in the implementation of “technologically or economically feasible alternatives.” A new provision, subparagraph (b)7.f, was added during the 2003 – 2004 triennial review: The alternatives that are considered by an applicant now include: “Any other examination of alternatives to lowering water quality to which the cabinet and the applicant can agree.” Inclusion of this provision expands the number of alternatives that could be considered in the high quality water antidegradation decision process.

What is EPA’s conclusion on whether 401 KAR 5:030 Section 1.(2)(b)(7)(f) complies with the requirements of 40 CFR § 131.12?

EPA believes this revision to Kentucky’s implementation procedure for exceptional waters is consistent with the provisions of 40 CFR § 131.12(a)(2). The provision retains a list of alternatives that must be considered for each application of the policy, but it also allows for the inclusion of other alternatives that can be identified based on the characteristics of the activity, any circumstances specific to the area where the activity is proposed to occur, or other wastewater treatment and/or disposal options available to the applicant. EPA approves this provision.

What is the background for EPA’s conclusion that 401 KAR 5:030 Section 1.(2)(b)(7)(f) complies with the requirements of 40 CFR § 131.12?

This provision is consistent with EPA’s discussion of the alternatives analysis component of a high quality water antidegradation review in the November 14, 2002 notice to the proposed federal regulation for Kentucky [67 FR 68974]. In that notice, EPA discussed the alternatives that were required in Kentucky’s standards in a review of a proposed discharge to an exceptional water, in relation to an option that EPA considered in the development of the proposal. EPA stated:

As described in section II.B, Kentucky has adopted implementation procedures for exceptional waters at 401 KAR 5:030 section 1.(3). These procedures require the consideration of the following discharge and enhanced treatment alternatives in a demonstration that allowing lower water quality is necessary to accommodate important economic or social development in the area in which the waters are located:

1. Discharge to other treatment facilities;

2. Use of other discharge locations;
3. Water reuse or recycling;
4. Process or treatment alternatives; and
5. On-site or subsurface disposal.

EPA did not propose these specific elements for consideration in high quality waters because they might limit the type of information that the Commonwealth could potentially use in making a determination on the proposed lowering of water quality. For example, a more costly alternative could be available which might result in less water quality degradation, but the additional cost might be considered to be reasonable, in light of the degradation that would occur. Although EPA chose not to adopt Kentucky's procedures for exceptional waters for today's proposal, the Agency solicits comment on whether the Agency should use these provisions rather than the more general ones included in today's proposal.

Kentucky included the phrase, "to which the cabinet and the applicant can agree," as a condition of other alternatives to lowering water quality that could be considered in the analysis. EPA believes that in order for an alternative to be considered as "technologically or economically feasible," the alternative must have the support of the engineering community (including the applicant and the applicant's consultants) that the alternative will achieve the intended result, and that the alternative is sufficiently affordable to allow the overall project to proceed. Since the Commonwealth's determination in regard to a proposed new or expanded discharge includes public review and comment, the Agency believes that there are adequate safeguards that would avoid the exclusion of alternatives to lowering water quality that could be viable options. EPA concludes that that the Commonwealth will exercise sound judgment in the implementation of this provision.

401 KAR 5:030 Section 1.(3)(b):

An introductory sentence was added to KAR 5:030 Section 1.(3)(b) [Implementation procedure for high quality water]: "KPDES permit applications for discharges into high quality water received after U.S. EPA approval of this subsection shall comply with this paragraph."

What is EPA's conclusion on whether this provision complies with the requirements of 40 CFR § 131.12?

This new standard is consistent with EPA's regulatory requirements regarding the timing that new or revised standards become effective for the purposes of the CWA. EPA approves this provision.

What is the background for EPA's conclusion that this provision complies with the requirements of 40 CFR § 131.12?

EPA understands the Commonwealth's action to adopt this new provision is based on revisions to EPA's water quality standards regulation, at 40 CFR § 131.21, which states, "If a State or authorized Tribe has adopted a water quality standard that goes into effect under State or Tribal law on or after May 30, 2000, then once EPA approves that water quality standard, it becomes the applicable water quality standard for purposes of the Act." This new antidegradation provision, i.e., the details for implementation of antidegradation for high quality waters, will become effective under Kentucky law only after EPA approves the procedure. EPA encouraged states and tribes to take this approach in the notice to EPA's final rule.

KAR 5:030 Section 1.(3)(b)(5), (6) and (7)

5. If the permit applicant does not accept the effluent limitations required by subparagraphs 2 and 3 of this paragraph, the applicant may request water quality based limitations permitted at standard design conditions. In making this request, the applicant shall demonstrate to the satisfaction of the cabinet that no technologically or economically feasible alternatives exist and that allowing lower water quality is necessary to accommodate important economic or social development in the area in which the water is located... The alternatives analysis and socioeconomic demonstration shall consider the following:

- a. Discharge to other treatment facilities;**
- b. Use of other discharge locations;**
- c. Water reuse or recycle;**
- d. Process and treatment alternatives;**
- e. On-site or sub-surface disposal;**
- f. Any other examination of alternatives to lowering water quality to which the cabinet and the applicant can agree;**
- g. The positive or beneficial effect of the facility on an existing environmental or public health problem;**
- h. The increase or avoidance of a decrease in employment;**
- i. The increase in production level;**
- j. The increase in operational efficiency;**
- k. Industrial or commercial benefit to the community; and**
- l. Any other economic or social benefit to the community.**

6. A permit applicant who has failed to demonstrate to the satisfaction of the cabinet the necessity for lowering water quality shall meet the effluent limitations required by this paragraph and additional requirements of the KPDES program.

7. A permit applicant who demonstrates to the satisfaction of the cabinet the necessity for lowering water quality shall meet the water quality based effluent limitations as outlined in 401 KAR 5:031.

What is EPA's conclusion on whether KAR 5:030 Section 1.(3)(b)(5), (6) and (7) complies with the requirements of 40 CFR § 131.12?

This listing of factors is consistent with the provisions of 40 CFR § 131.12(a)(2) and EPA's previous interpretations of this regulation. (See 63 FR 36784 and 67 FR 68980) EPA approves this provision.

What is the background for EPA's conclusion that KAR 5:030 Section 1.(3)(b)(5), (6) and (7) complies with the requirements of 40 CFR § 131.12?

In EPA's Advance Notice of Proposed Rulemaking for the federal water quality standards regulation (40 CFR Part 131) dated July 7, 1998, EPA discussed the issue of how states might identify "important social or economic activities" as a topic for public comment. In that discussion, EPA stated:

The significance of determining if an activity will provide for important social or economic benefit is that, absent important social or economic benefit, degradation under tier 2 must not be allowed. Factors that may be addressed in such an evaluation include: (a) employment (i.e., increasing, maintaining, or avoiding a reduction in employment, (b) increased production, (c) improved community tax base, (d) housing, and (e) correction of an environmental or public health problem.

The information required by the Commonwealth in KAR 5:030 Section 1.(3)(b)(5)g. – 1. specifically addresses three of the factors that EPA included in the discussion of "important social or economic activities" in the ANPRM. Kentucky's inclusion of two general categories of other factors (i.e., industrial or commercial benefit to the community, and any other economic or social benefit to the community) provide flexibility for the evaluation of other information similar to the other types of information discussed by EPA in the proposed rule making notice (improved community tax base and housing).

The first five treatment/disposal/process alternatives (with the exception of item f, "any other examination of alternatives to lowering water quality to which the Cabinet and the applicant can agree") are the same alternatives that were previously adopted by Kentucky in the evaluation of proposed discharges to exceptional waters. These five alternatives and the six socio-economic factors are the same factors that were included by Kentucky in a previous rule proposal published on October 1, 1999. EPA discussed these eleven factors in the notice to the proposed federal rule for Kentucky published in the Federal Register on November 14, 2002. In the notice, EPA requested comment on the possible use of these factors as part of a final federal rule for Kentucky in a discussion of the "level of detail" for a final rule. EPA notes that no commenters on the proposed rule objected to the use of these factors for the purpose of a determination by Kentucky in regard to whether "allowing lower water quality is necessary to accommodate important social or economic development" in a final federal rule. Many commenters supported the

inclusion of these factors in order to provide sufficient definition for Kentucky to implement that part of the rule.

EPA's review of the Commonwealth's inclusion of factor f above (any other examination of alternatives to lowering water quality to which the Cabinet and the applicant can agree) is summarized in the portion of this memorandum that addresses the revisions made to Subparagraph (b)7 of Section 1 (the alternatives analysis component for evaluation of discharges to exceptional waters). EPA believes that inclusion of this factor provides the Commonwealth with additional flexibility in the identification of alternatives, based on the circumstances of each individual project under review by the Cabinet.

401 KAR Section 3:

Section 3. [Incorporation by Reference], was revised to incorporate updates to the previously listed reference documents, as follows:

- (a) The document, "Methods for Assessing Biological Integrity of Surface Water," KDOW, 1993, was replaced by "Development and Application of the Kentucky Index of Biotic Integrity (KIBI), KDOW, 2003.
- (b) The document, "A Macroinvertebrate Bioassessment Index for Streams of the Interior Plateau Ecoregion in Kentucky," KDOW, June 1999, was replaced by, "The Kentucky Macroinvertebrate Bioassessment Index, KDOW, 2003.

Section 3. was also revised to include new reference document:

- (d) 401 KAR 5:030 Antidegradation Implementation Procedures Process Flow Chart, May 25, 2004, KPDES Branch, Kentucky Division of Water, Kentucky Department for Environmental Protection

What is EPA's conclusion on whether this provision complies with the requirements of 40 CFR § 131.12?

The first two of these revisions represent updates to the previous references to current versions of the documents. The third revision is the addition of a flow chart describing the steps that are required in Sections 1 and 2 of KAR 5:030 [Antidegradation implementation methodology] to implement the Commonwealth's antidegradation policy for point source discharges. The chart merely summarizes the individual steps of this process, for which the regulatory requirements have been adopted in other parts of the regulation. EPA approves these revisions.

401 KAR 5:002(119):

Kentucky adopted the following definition of "high quality water" in 401 KAR 5:002:

(119) "High quality water" means a surface water categorized as high quality by the cabinet pursuant to 401 KAR 5:030.

What is EPA's conclusion on whether this provision complies with the requirements of 40 CFR § 131.12?

This definition does not specify additional categorization criteria for high quality waters, as it only serves to acknowledge the classification framework for antidegradation purposes in 401 KAR 5:030. EPA approves this provision.

401 KAR 5:002(318):

Kentucky deleted the definition for "use protected water" in 401 KAR 5:002 during the 2003 – 2004 triennial review since this category of waters no longer exists in Kentucky water quality standards, and, therefore, is not relevant to the classification of waters of the Commonwealth for antidegradation purposes. EPA approves this revision.


What is EPA's conclusion on whether this provision complies with the requirements of 40 CFR § 131.12?

This definition related to the previous classification framework for antidegradation purposes in 401 KAR 5:030, which included only three categories: ONRWs, exceptional waters, and use protected waters. The use protected water category was deleted from the standards as a result of the new classification framework, and the revision to 401 KAR 5:002 reflect that change. This deletion is consistent with the Clean Water Act, based on EPA's review of the new antidegradation policy implementation methodology in 401 KAR 5:030 adopted during the 2003 - 2004 triennial review.

PART – 6 SUMMARY OF CONCLUSIONS

Based on EPA's review of regulation 401 KAR 5:030, and the related provisions in 401 KAR 5:002, EPA concludes that the new and revised standards submitted by the Commonwealth meet the requirements of the CWA and 40 CFR Part 131. Therefore, these new and revised standards are in effect for all purposes of the CWA.

4/12/05
Date


James D. Giattina, Director
Water Management Division

Appendix A

Technical Support Document

Comparison of Allowable Effluent Levels Based on Application of Toxicity Provisions Related to Chronic and Acute Criteria

This analysis compares the methods to determine allowable effluent concentrations of pollutants based on application of chronic toxicity-based and acute toxicity-based provisions of Kentucky's water quality standards at standard design conditions. Either case can result in a water quality-based effluent limitation, and, therefore, effluent limitations derived from each case are subject to the provisions of Kentucky's water quality standards that apply to "water quality based limitations," e.g., 401 KAR 5:030 Section 1(3)(b)3. for high quality waters. The most stringent endpoint based on the application of either case must be met.

Allowable instream concentrations of pollutants are listed in Table 1 of KAR 5:031 Section 6. This table includes both acute and chronic toxicity-based criteria.

For chronic toxicity, a water quality-based effluent limitation is calculated based on any dilution available at the seven-day, ten-year low flow (7Q10) value. (see Section KAR 5:031 Section 3.(3)(a).) Assuming that complete mixing with the receiving stream occurs near the point of discharge, application of these chronic toxicity-based criteria allows the discharge of pollutants at a rate that will cause the chronic criteria values to be met after mixing. In other words, the chronic criteria must be met after mixing with available dilution at the point of discharge.

For acute toxicity, a water quality-based effluent limitation is established based on application of the acute criteria in Table 1 through the mixing zone provisions of Kentucky's standards. Kentucky's mixing zone policy, at KAR 5:029 Section 4, states:

(1) The cabinet may assign definable geometric limits for mixing zones for a discharge or a pollutant or pollutants within a discharge. Applicable limits shall include the linear distances from the point of discharge, surface area involvement, volume of receiving water, and shall take into account other nearby mixing zones. Dilution provided by assigned mixing zones shall not be allowed until applicable limits are assigned by the cabinet in accordance with this section.

(2) Concentrations of toxic substances that exceed the acute criteria for protection of aquatic life in 401 KAR 5:031 shall not exist within an assigned mixing zone or in the discharge itself unless a zone of initial dilution is assigned. A zone of initial dilution may be assigned pursuant to subsection (3) of this section. Chronic criteria for the protection of aquatic life and criteria for the protection of human health from the consumption of fish tissue shall be met at the edge of the assigned mixing zone.

Kentucky's mixing zone policy requires that the maximum concentration of pollutants not exceed the acute criteria values listed in Table 1 of KAR 5:031 Section 6, unless a zone of initial dilution. For the purposes of this analysis, EPA assumed that a zone of initial dilution would not be appropriate, due to the relatively small amount of dilution available under the flow scenarios used in the analysis.

EPA analyzed the pollutants for which both acute and chronic water quality criteria were adopted by Kentucky in KAR 5:031 Section 6, Table 1. EPA excluded the seven pollutants for which criteria for protection of human health would be the more sensitive criteria for establishing effluent limits for those pollutants: chlordane, dieldrin, heptachlor, heptachlor epoxide, mercury, toxaphene, and DDT. EPA excluded these pollutants from this analysis because the effect of applying the human health-based criteria would result in effluent limitations far below concentrations that would cause adverse effects on aquatic life.

EPA then analyzed the relationship of the acute to chronic criteria values for the remaining 19 pollutants, and calculated the ratio of the acute criterion to the chronic criterion for each parameter. Of the 19 remaining pollutants, the values of acute to chronic ratios (ACR) range from 1 to 26. Six of the parameters were found to have an ACR of 2.0 or less, and six of the parameters were found to have an ACR ranging from 2.3 to 4.0. Only five of these parameters were found to have an ACR of greater than 4: cadmium (6.6), cyanide (4.2), lead, (26), nickel (9.0), and parathion (5.0).

EPA selected an ACR value of 4 to compare the effluent and ambient levels of a toxic pollutant that are allowable based on application of the chronic and acute toxicity provisions of Kentucky water quality standards. An ACR value of 4 is representative of all but five (four if cyanide is included – ACR of 4.2) of the pollutants in KAR 5:031 Section 6, Table 1.

Using an ACR value of 4 and a chronic criterion value of 100 ug/l (in order to allow conversion to other pollutants, this can also be considered to be 100% of the chronic criterion value), an acute criterion was calculated as 400 ug/l (or 400% of the chronic criterion value).

As described above, any discharge must meet the most stringent endpoint of application of the chronic toxicity-based and acute toxicity-based provision. This principle, in conjunction with the ACR relationship of toxicity-based criteria adopted by Kentucky, is used as part of the analysis outcome of application of 401 KAR 5:030 Section 1.(3)(b)1.e. and 401 KAR 5:030 Section 1(3)(b)3. in parts 2 and 3 below.

Appendix B Technical Support Document

Analysis of the 20% Provision

This document summarizes EPA's technical review of instream water quality effects of application of 401 KAR 5:030 Section 1.(3)(b) i.e., "the 20% provision."

1. Dischargers listed in clauses a through e of this subparagraph are subject to control by existing cabinet programs including the KPDES program.

e. KPDES permit renewals and modifications that result in less than a twenty (20) percent increase in pollutant loading from the previously permitted pollutant loading

Using a mass balance equation, EPA first calculated instream concentrations of a pollutant downstream of a discharge under three discharge scenarios. Each discharge scenario was based on a specified ratio of upstream flow (i.e., upstream of the discharge) to discharge flow. A chronic criterion value was assumed to be a value of 100 ug/l (or 100% of the chronic criterion value) for this analysis in order to translate the results to other criterion values. (See the discussion of application of acute toxicity- and chronic toxicity-based water quality criteria in Part 1 above.)

For each case analyzed, EPA calculated: (1) the downstream pollutant concentration under the current, "pre-expansion" conditions, and (2) the downstream pollutant concentration resulting from an increase of 20% of the effluent flow, representing the discharge after a 20% increase in effluent loading.

For each of these scenarios, background concentrations of the pollutant in the upstream flow were varied from zero to 90 ug/l (or alternatively, from zero to 90% of the applicable chronic criteria level). Upstream to discharge flow ratios of 4:1, 1:1, and 1:2 were used since they represent a wide variety of background to discharge flow conditions. The results of those calculations are presented in Tables 1, 2, and 3.

Table 1
 Ratio of Upstream Flow to Effluent Flow of 4:1
 Expanded Discharge [Flow expanded to 1.2]
 Water Quality Criterion is 100 ug/l

Background Conc	Current Effl Conc	Down Conc	Expanded Effl Flow	Effluent Conc	New Down Conc	Change in Down Conc	Assim Cap Rem
0	25	5	1.2	25	5.8	0.8	99.1
0	50	10	1.2	50	11.5	1.5	98.3
0	75	15	1.2	75	17.3	2.3	97.3
0	100	20	1.2	100	23.1	3.1	96.1
0	150	30	1.2	150	34.6	4.6	93.4
0	200	40	1.2	200	46.1	6.1	89.8
25	25	25	1.2	25	25	0	100
25	50	30	1.2	50	30.7	0.7	99.0
25	100	40	1.2	100	42.3	2.3	96.2
25	150	50	1.2	150	53.8	3.8	92.4
25	175	55	1.2	175	59.6	4.6	89.8
25	200	60	1.2	200	65.4	5.4	86.5
50	25	45	1.2	25	44.2	(-0.8)	101
50	50	50	1.2	50	50	0	100
50	75	55	1.2	75	55.8	0.8	98.5
50	100	60	1.2	100	61.5	1.5	96.2
50	125	65	1.2	125	67.3	2.3	93.4
50	150	70	1.2	150	73.1	3.1	89.7
50	175	75	1.2	175	78.8	3.8	84.8
50	200	80	1.2	200	84.6	4.6	77.0
75	50	70	1.2	50	69.2	(-0.8)	103
75	75	75	1.2	75	75	0	100
75	100	80	1.2	100	80.8	0.8	96.0
75	125	85	1.2	125	86.5	1.5	90.0
75	150	90	1.2	150	92.3	2.3	77.0
75	175	95	1.2	175	98.1	3.1	38.0

Table 2
 Ratio of Upstream Flow to Effluent Flow of 1:1
 Expanded Discharge [Flow expanded to 1.2]
 Water Quality Criterion is 100 ug/l

Background Conc	Current		Expanded		New	Change	Assim
	Effl Conc	Down Conc	Effl Flow	Effluent Conc	Down Conc	in Down Conc	Cap Rem
0	25	12.5	1.2	25	13.6	1.1	98.7
0	50	25	1.2	50	27.3	2.3	96.9
0	75	37.5	1.2	75	40.9	3.4	94.6
0	100	50	1.2	100	54.5	4.5	91.0
0	125	62.5	1.2	125	68.3	5.8	84.5
0	150	75	1.2	150	81.8	6.8	72.8
0	175	87.5	1.2	175	95.5	8.0	36.0
25	25	25	1.2	25	25	0	100
25	50	37.5	1.2	50	38.6	1.1	98.2
25	75	50	1.2	75	52.3	2.3	95.4
25	100	62.5	1.2	100	65.9	3.4	90.9
25	125	75	1.2	125	79.5	4.5	82.0
25	150	87.5	1.2	150	93.2	5.7	54.4
50	25	37.5	1.2	25	36.4	(-0.9)	101
50	50	50	1.2	50	50	0	100
50	75	62.5	1.2	75	63.6	1.1	97.1
50	100	75	1.2	100	77.3	2.3	90.8
50	125	87.5	1.2	125	90.9	3.4	72.8
75	50	62.5	1.2	50	61.4	(-0.9)	102
75	100	87.5	1.2	100	88.6	1.1	91.2

Table 3
Ratio of Upstream Flow to Effluent Flow of 1:2
Expanded Discharge [Flow expanded to 2.4]
Water Quality Criterion is 100 ug/l

Background Conc	Current		Expanded		New Down Conc	Change in Down Conc	Assim Cap Rem
	Effl Conc	Down Conc	Effl Flow	Effl Conc			
0	25	16.7	2.4	25	17.6	0.9	98.9
0	50	33.3	2.4	50	35.3	2.0	97.0
0	75	50	2.4	75	52.9	2.9	94.2
0	100	66.7	2.4	100	70.6	3.9	88.2
0	125	83.3	2.4	125	88.2	4.9	72.3
25	25	25	2.4	25	25	0	100
25	50	41.7	2.4	50	42.6	0.9	98.4
25	75	58.3	2.4	75	60.3	2.0	95.2
25	100	75	2.4	100	77.9	2.9	88.4
25	125	91.7	2.4	125	95.6	3.9	53.0
50	25	33.3	2.4	25	32.3	(-1.0)	101
50	50	50	2.4	50	50	0	100
50	75	66.7	2.4	75	67.6	0.9	97.3
50	100	83.3	2.4	100	85.3	2.0	88.0
75	50	58.3	2.4	50	57.3	(-1.0)	102
75	100	91.7	2.4	100	92.6	0.9	89.1

These modeling results show that a 20% increase in loading could result in a lowering of water quality of as much as 8% of the applicable water quality criterion value for the three flow scenarios analyzed.

EPA also considered the effect of a 20% increase in loading on the available assimilative capacity of the water body. Of all of the 62 cases analyzed, there are 17 instances where an expansion of 20% would result in the allocation of more than 10% of assimilative capacity of the receiving stream. A value of 10% of available assimilative capacity, i.e. remaining assimilative capacity, is the level that represents "insignificant degradation" in EPA's Water Quality Initiative for the Great Lakes (Water Quality Guidance for the Great Lakes System: Supplementary Information Document (SID), EPA-820-B-95-001, March 1995, p. 203.) These 17 cases are shown in **bold text** in Tables 1 through 3, and generally involve situations where the "pre-expansion" effluent concentration is relatively high, i.e., the effluent value is either at, or exceeds, the chronic criterion value, and the current downstream pollutant concentration is also relatively high, i.e., 14 of the 17 instances involve "current" downstream concentrations of 75% of the chronic criterion or more.

Appendix C Technical Support Document

Analysis of the 1/2 Effluent Limits Provision

This document summarizes EPA's technical review of instream water quality effects of application of 401 KAR 5:030 Section 1(3)(b)3., "the 1/2 effluent limits provision."

401 KAR 5:030 Section 1(3)(b)3.:

Except as provided in subparagraph 7 of this paragraph, KPDES permit for a new non-domestic discharge or an expanded non-domestic discharge into high quality water shall be restricted to no more than one-half (1/2) of the water quality based limitations that would have been permitted at standard design conditions.

Using a mass balance equation, EPA first calculated instream concentrations of a pollutant downstream of a new discharge under four discharge scenarios. The approach was similar to that used to analyze the 20% provision in part 2 above. Each new discharge scenario was based on a specified ratio of upstream flow (i.e., upstream of the discharge) to discharge flow. A chronic criterion value was assumed to be a value of 100 ug/l for this analysis in order to translate the results to other criterion values. In other words, this 100 ug/l value could also be considered as 100% of a chronic criterion value, with other concentrations expressed as a percentage of the criterion value, (i.e., in increments of 10% of the criterion value).

For each of these scenarios, background concentrations of the pollutant in the upstream flow were varied from zero to 90 ug/l, or alternatively, from zero to 90% of the applicable chronic criteria level. Upstream to discharge flow ratios of 9:1, 4:1, 1:1, and 1:2 were used to assess a broad range of discharge situations. These flow ratios were chosen since they represent a wide variety of background to discharge flow conditions. After an effluent concentration was established based on "standard design conditions," this water quality based limitation was reduced by 1/2 to reflect application of the provisions of KAR 5:030 Section 1(3)(b)3. The results of those calculations are presented in the first three columns of Tables 4 through 7.

Second, EPA analyzed the allowable effluent pollutant concentrations based on application of the acute toxicity-based standards, i.e., Kentucky's mixing zone provisions. As outlined in the discussions in part 1 above, the maximum effluent level of a pollutant based on these provisions of Kentucky standards related to acute toxicity protection that is allowed under standard design conditions was established at 400 ug/l (or 400% of the chronic criterion value) for this analysis. Applying this provision to this value yields a maximum water quality-based effluent limit of 200 ug/l (or 200% of the chronic criterion), which is the maximum water quality based level that could be

discharged if acute toxicity was the only consideration, i.e. independent of the level that is needed to meet a chronic toxicity-based criterion.

The "1/2 Chronic Water Quality-Based Effluent Concentrations" in the second column of Tables 4 through 7 were then compared to allowable effluent values related to acute toxicity requirements. Several of the "1/2 Chronic Water Quality-Based Effluent Concentration" values calculated using only the instream chronic criteria value exceed a value of 200 ug/l, i.e., for the new discharge scenarios involving a relatively large amount of upstream dilution flow.

In Tables 4 and 5 below, this highest allowable effluent concentration is shown as a value of 200 ug/l in the fourth column entitled, "1/2 Acute Criteria," for each case where the "1/2 Water Quality-Based Effluent Concentration" was greater than a value of 200 ug/l. In other words, the acute toxicity-based water quality-based limitation is more stringent in application than the chronic toxicity-based limitation. The "Estimated Actual Downstream Concentrations" in the fifth column of Tables 1 and 2 were then calculated using this more stringent acute toxicity-based effluent concentration.

Table 4
Water Quality Criteria Value is 100 ug/l
Ratio of Upstream Flow to Effluent Flow of 9:1

Upstream Conc	1/2 Chronic WQ-Based Effluent Conc	Calculated Downstream Conc	1/2 Acute Criteria*	Estimated Actual Downstream Conc**	Change over Upstream Conc
0	(500)***	(50)***	200	20	20
10	(455)	(54.5)	200	29	19
20	(410)	(59)	200	38	18
30	(365)	(63.5)	200	47	17
40	(320)	(68)	200	56	16
50	(275)	(72.5)	200	65	15
60	(230)	(77)	200	74	14
70	185	81.5			11.5
80	140	86			6
90	95	90.5			0.5

* assuming an ACR of 4

** after mixing

*** values in parenthesis are not used in the analysis since these concentrations are not allowed due to potential acute toxicity effects

Table 5
Water Quality Criteria Value is 100 ug/l
Ratio of Upstream Flow to Effluent Flow of 4:1

Upstream Conc	1/2 Chronic WQ-Based Effluent Conc	Calculated Downstream Conc	1/2 Acute Criteria*	Estimated Actual Downstream Conc**	Change over Upstream Conc
0	(250)***	(50)***	200	40	40
10	(230)	(54)	200	48	38
20	(210)	(58)	200	56	36
30	190	62			32
40	170	66			26
50	150	70			20
60	130	74			14
70	110	78			8
80	90	82			2
90	70	86			(-4)

* assuming an ACR of 4

** after mixing

*** values in parenthesis are not used in the analysis since these concentrations are not allowed due to potential acute toxicity effects

Table 6
Water Quality Criteria Value is 100 ug/l
Ratio of Upstream Flow to Effluent Flow of 1:1

Upstream Concentration	1/2 Chronic WQ-Based Effluent Concentration	Downstream Concentration	Change over Upstream Concentration
0	100	50	50
10	95	52.5	42.5
20	90	55	35
30	85	57.5	27.5
40	80	60	20
50	75	62.5	12.5
60	70	65	5
66.7	66.7	66.7	0
70	65	67.5	(-2.5)
80	60	70	(-10)
90	55	72.5	(-17.5)

Table 7
Water Quality Criteria Value is 100 ug/l
Ratio of Upstream Flow to Effluent Flow of 1:2

Upstream Concentration	1/2 Chronic WQ-Based Effluent Concentration	Downstream Concentration	Change over Upstream Concentration
0	75	50	50
10	72.5	51.7	41.7
20	70	53.3	33.3
30	67.5	55	25
40	65	56.7	16.7
50	62.5	58.3	8.3
60	60	60	0
70	57.5	61.7	(-8.3)
80	55	63.3	(-16.7)
90	52.5	65	(-25)

The results of this analysis of new discharges are summarized as follows:

- Under the scenario where the ratio of upstream flow to discharge flow is 9:1 (Table 1), downstream ambient concentrations are estimated to rise by no more than 20% (e.g., increase by no more than 20 ug/l if the chronic criterion is 100 ug/l) of the chronic criterion value over upstream concentration.
- Under the scenario where the ratio of upstream flow to discharge flow is 4:1 (Table 2), downstream ambient concentrations are estimated to rise by no more than 40% of the chronic criterion value (e.g., increase by no more than 40 ug/l if the chronic criterion is 100 ug/l) over upstream concentrations.
- Under the scenario where the ratio of upstream flow to discharge flow is 1:1 (Table 3), downstream ambient concentrations may rise as much as 50% of the chronic criterion value, but only when the background ambient concentration of upstream waters is zero or near zero. The amount of lowering of water quality becomes much smaller with increased ambient background concentrations in flow upstream of the discharge. Application of this provision results in **improved** water quality in cases where upstream concentrations are 66.7% of the chronic criteria value or greater.
- Under the scenario where the ratio of upstream flow to discharge flow is 1:2 (Table 4), downstream ambient concentrations may rise as much as 50% of the criterion value, but only when the background ambient concentration of upstream waters is zero or near zero. The downstream concentration will not

increase to a value greater than 60% of the chronic criterion, even if the upstream concentration is as high as 50% of the criterion value. Application of this provision results in **improved** water quality in cases where upstream concentrations are 60% of the chronic criterion value or greater.

EPA then analyzed the variation of instream flow at several gaging stations in the Commonwealth to estimate the frequency of occurrence for these projections of water quality lowering. EPA selected eight U.S Geological Survey (USGS) gaging stations for this analysis.

Kentucky's water quality standards require that effluent limitations be established at the instream flow specified as the standard design condition, which is the seven day minimum average flow with an occurrence interval of ten years (7Q10). See KAR 5:031 Section 3.(3)(a). Therefore, EPA calculated the 7Q10 flow for these stations, the frequency of time that the flow would exceed the 7Q10 flow, and the frequency of time that the flow has exceeded the 7Q10 at multiples of 5 times the 7Q10 flow and 10 times the 7Q10 flow at each station. The results of this analysis are presented in Table 8.

Table 8
Frequency of Low Flows
At Eight Gaging Stations

<u>Water Body</u>	7Q10		5 Times 7Q10		10 Times 7Q10	
	<u>Flow</u>	<u>% Exceeds 7Q10</u>	<u>Flow</u>	<u>% Exceeds 5 X 7Q10</u>	<u>Flow</u>	<u>% Exceeds 10 X 7Q10</u>
1) Troublesome Cr At Noble	0.21	99%	1.04	97%	2.07	95%
2) Red Bird River Near Big Creek	0.75	100%	3.5	95%	7.5	89%
3) Goose Creek At Manchester	1.03	99%	5.1	92%	10.3	84%
<u>1) - 3) Average</u>		<u>99.3%</u>		<u>94.7</u>		<u>89.3</u>
4) Beaver Creek Cumberland Watershed	1.4	100%	7.2	84%	14.4	69%
5) Clarks River At Almo	2.3	99%	11.7	79%	23.4	57%
<u>4) - 5) Average</u>		<u>99.5%</u>		<u>81.5%</u>		<u>63.0%</u>
6) Little River Near Cadiz	13	100%	63	68%	127	52%
7) South Fork Cumberland	25	100%	124	82%	247	70%
8) Cumberland River Near Harlan	31	99%	153	71%	305	55%
<u>6) - 8) Average</u>		<u>99.7%</u>		<u>73.7%</u>		<u>59.0%</u>

This data demonstrates that there is a relationship between the 7Q10 flow of a stream and the percentage of flows that exceed the 7Q10 flow. There is also a relationship between the 7Q10 flow and the percentage of flows that exceed multiples of the 7Q10 flow, e.g., five or ten times the 7Q10 flow. For example, streams with the lowest 7Q10 flow (7Q10 flows ranging from 0.21 to 1.03 cfs) were found to exceed the 7Q10 flow 99.3% of the time; were found to exceed a flow of five times the 7Q10 flow 94.7 % of the time; and were found to exceed a flow of ten times the 7Q10 flow 89.3 % of the time. Streams with much greater 7Q10 flows, i.e., ranging from 13 to 31 cfs, were found to exceed the 7Q10 flow 99.7% of the time; were found to exceed a flow of five times the 7Q10 flow 73.7 % of the time; and were found to exceed a flow of ten times the 7Q10 flow 59.0 % of the time.

Using this analysis of instream flow, EPA projected downstream water quality concentrations using an upstream flow of five times the 7Q10 low flow for the highest downstream concentration scenarios in Tables 5, 6 and 7. For the 4:1, 1:1, and 1:2 upstream to discharge flow ratio scenarios, the upstream flow value was adjusted by a factor of five to represent these more common flow conditions (i.e., upstream to discharge flow ratios of 20:1, 5:1, and 5:2, respectively). Upstream pollutant concentrations were not changed from the 7Q10 low flow scenarios. EPA then used the flow frequency information in Table 8 to project the frequency of lowering of water quality that would occur at the "five times 7Q10 flow." The results of this analysis are presented in Table 9, and the results of the three steps are combined in Table 10.

Table 9
Projected Downstream Concentrations
At Flows Equal to Five Times 7Q10 Flow Conditions

A. 4:1 Dilution at Five Times 7Q10 (20:1)

Upstream Concentration	1/2 WQ-Based Effluent Conc	4:1 Downstream Conc	20:1 Downstream Conc	20:1 Change over Upstream Concentration
0	200	40	9.5	9.5
10	200	48	19.0	9.0
20	200	56	28.5	8.5
30	190	62	37.6	7.6
40	170	66	46.1	6.1

B. 1:1 Dilution at Five Times 7Q10 (5:1)

C.

Upstream Concentration	1/2 WQ-Based Effluent Concentration	1:1 Down Conc	5:1 Down Conc	5:1 Change over Upstream Concentration
0	100	50	16.7	16.7
10	95	52.5	24.1	14.1
20	90	55	31.7	11.7
30	85	57.5	39.2	9.2
40	80	60	43.3	3.3

C. 1:2 Dilution at Five Times 7Q10 (5:2)

D.

Upstream Concentration	1/2 WQ-Based Effluent Conc	1:2 Down Conc	5:2 Down Conc	5:2 Change over Upstream Concentration
0	75	50	21.4	21.4
10	72.5	51.7	27.9	17.9
20	70	53.3	34.3	14.3
30	67.5	55	40.7	10.7
40	65	56.7	47.1	7.1

Table 10
Projected Downstream Water Quality
Frequency of Occurrence
For 7Q10 and 5 Times 7Q10 Flow

A. 7Q10 Flows in the Range of 0.21 to 1.03 cfs

Dilution Scenario	7Q10 Flow "Worst Case" Downstream Concentration	Percent of Time 7Q10 Flow Occurs	5 Times 7Q10 Downstream Concentration	Percent of Time 5 Times 7Q10 Occurs
4:1	40	0.7	9.5	5.3
1:1	50	0.7	16.7	5.3
1:2	50	0.7	21.4	5.3

B. 7Q10 Flows in the Range of 1.4 to 2.3 cfs

Dilution Scenario	7Q10 Flow "Worst Case" Downstream Concentration	Percent of Time 7Q10 Flow Occurs	5 Times 7Q10 Downstream Concentration	Percent of Time 5 Times 7Q10 Occurs
4:1	40	0.5	9.5	19.5
1:1	50	0.5	16.7	19.5
1:2	50	0.5	21.4	19.5

C. 7Q10 Flows in the Range of 13 to 31 cfs

Dilution Scenario	7Q10 Flow "Worst Case" Downstream Concentration	Percent of Time 7Q10 Flow Occurs	5 Times 7Q10 Downstream Concentration	Percent of Time 5 Times 7Q10 Occurs
4:1	40	0.3	9.5	26.3
1:1	50	0.3	16.7	26.3
1:2	50	0.3	21.4	26.3

Table 7A represents the case of streams with a 7Q10 flow of 1 cfs or less (with a background pollutant concentration of zero) for new discharges ranging from 0.25 to 2 cfs. The data show that the "worst case" lowering of water quality (a rise of pollutant concentrations to either 40 or 50% of the criterion value) will occur only 0.7% of the time. A 10 to 21% lowering of water quality (expressed as a percentage of the criteria value) will occur at a flow that is five times the 7Q10 flow for these streams, and this will occur only 5% of the time, i.e., over the range of flows for the water body, depending on the relative amounts of upstream and discharge flows.

Table 7B represents the case of streams with a 7Q10 flow of 1.4 to 2.3 cfs (with a background pollutant concentration of zero) for new discharges ranging from 0.35 to 4.6 cfs. The data show that the "worst case" lowering of water quality (a rise of pollutant concentrations to either 40 or 50% of the criterion value) will occur only 0.5% of the time. A 10 to 21% lowering of water quality (expressed as a percentage of the criteria value) will occur at a flow that is five times the 7Q10 flow for these streams, and this will occur only 20% of the time, depending on the relative amounts of upstream and discharge flows.

Table 7C represents the case of streams with a 7Q10 flow from 13 to 31 cfs (with a background pollutant concentration of zero) or less for new discharges ranging from 3.25 to 62 cfs. The data show that the "worst case" lowering of water quality (a rise of pollutant concentrations to either 40 or 50% of the criterion value) will occur only 0.3% of the time. A 10 to 21% lowering of water quality (expressed as a percentage of the criteria value) will occur at a flow that is five times the 7Q10 flow for these streams, and this will occur only 26% of the time, depending on the relative amounts of upstream and discharge flows.

Tables 7A, 7B and 7C also show that, as the background concentration of the pollutant increases, the degree of water quality lowering is less than these "worst case" scenarios. For example, if the background pollutant concentration is 40% of the criteria value, the downstream concentration will be increased by a maximum of 26% of the criteria value less than 1% of the time, and by less than 7% of the criteria value at a flow of five times the 7Q10 flow, i.e., less than 26% of the time.

In summary, this analysis shows that application of this provision for new discharges will result in the maximum lowering of water quality to levels that are 20 to 50% of background levels (when expressed as a percentage of the criterion value). This maximum amount of lowering will only occur at flows that occur less than 0.7% of the time, and will occur only in cases where the upstream concentration of a pollutant is zero, or close to zero. Where the upstream pollutant concentration is at 20% of the criteria value or higher, lowering of water quality will be less than this range. In some cases, application of this provision will prevent **any** lowering of water quality downstream of a new discharge. Also, if the discharge flow is less than those used in these examples, lowering of water quality will be less than that calculated.

Where acute toxicity is not an issue, i.e., in cases where the water quality based limitation is controlled by standards not related to acute toxicity, water quality could be lowered more than 10 to 21% of the criteria value for a pollutant for a maximum of 26% of the time, depending on the relative upstream and discharge flows. If the flow of a discharge is relatively small, this lowering will occur in the range of 5 to 20% of the time. Also, application of more stringent conditions during Kentucky's wasteload allocation/permit limitation derivation processes, e.g., allowance for mixing with less than 100% of upstream flow, would result in instream pollutant levels that are less than the levels projected to occur by EPA.

In summary, Kentucky's approach preserves a significant amount of the receiving water body's assimilative capacity in cases where background pollutant concentrations are low. Where background pollutant concentrations reach levels that approach the chronic water quality criterion, this approach preserves almost all the remaining assimilative capacity, or would lead to downstream water quality that is improved when compared to upstream background levels.

